WEIL-McLAIN®

SlimFit™

Building Automation System Interface Instructions & Reference Guide -

UPC BACNET TRANSLATOR

UPC BACNET Conversion Kit P/N 383-600-304

⚠WARNING This interface instruction must only be used by a qualified heating installer/service technician. Read all instructions, including this manual and all other information shipped with the boiler, before installing. Perform steps in the order given. Failure to comply could result in severe personal injury, death or substantial property damage.

Part number 550-100-130/1113

Contents

Tables 3-6, Contents courtesy of
Honeywell International Inc.
Literature Number: 65-0310–02
Date: (06/13)

Hazard definitions

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product.

⚠DANGER Indicates presence of hazards that will cause severe personal injury, death or substantial property damage.

⚠CAUTION Indicates presence of hazards that will or can cause minor personal injury or property damage.

⚠WARNING Indicates presence of hazards that can cause severe personal injury, death or substantial property damage.

NOTICE Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury or property damage.

⚠WARNING **To the installer:**

These instructions must only be used by a qualified installer/service technician. Read all Instructions completely before beginning the installation. Failure to follow all instructions can cause severe personal injury, death or substantial property damage.

Part number 550-100-130/1113

Introduction

What is this document about ?

This document will enable you to install and configure the UPC into the Building Automation System (BAS).

This manual is to be used in conjunction with the SlimFit Boiler Installation Manual and the User's Information Manual. Follow the boiler manual, startup and maintenance procedures, before finalizing installation.

⚠CAUTION The boiler system needs to be completely powered down before the UPC module can be installed.

What is the UPC ?

The UPC is a general purpose protocol converter (translator) for mounting within the building envelope. The UPC can convert proprietary equipment data into open protocol data , enabling a single piece of equipment to reside on a BACnet network, where it can be monitored or controlled by a Building Automation System (BAS).

The UPC is programmed with 144 Modbus points which are translated and viewable over the user's BACnet system. Point specific information can be found in "Table 1. Map of Recommended BACnet Communication Points." on page 11 as well as "Table 2. Complete Map of BACnet Communication Points" on page 15 of this manual. For all questions concerning the UPC and its functionality, please contact the Weil-McLain Technical Service Department @ 1-800-526-6636.

Specifications

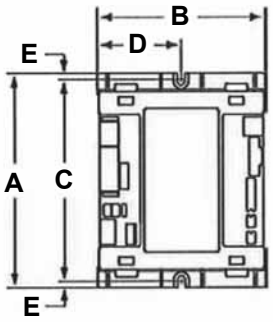
Driver	DRV_UPC
Maximum number of control programs	10
Maximum number of BACnet objects*	500
Number of Programmed Points	144

* Depends on available memory

Power	24 Vac ±10%, 50-60 Hz 10 VA power consumption (16 VA with BACview attached) 26 Vdc (25V min, 30 V max) Single Class 2 source only, 100 VA or less
Port 1a	For EIA-485 2 -wire communications, configurable as a device port or BAS port. Protocols supported: • BACnet over ARC156 • BACnet over MS/TP • Modbus (RTU/ASCII)

Specifications (continued)

Port 2	For EIA-232 or EIA-485 (2 -wire or 4-wire). Network protocols Selectable for: • BACnet (MS/TP or PTP) • Modbus
Local Access port	For local communication with a laptop computer running WebCTRL or for communication with a BACview[6].
Memory	1 MB non-volatile battery-backed RAM, 1 MB Flash memory, 16 bit memory bus
Battery	10-year Lithium CR2032 battery provides a minimum of 10,000 hours of data retention during power outages.
Protection	Built-in surge and transient protection circuitry - internal solid state polyswitches on the incoming power and network connections.
Status indicators	LED's indicate status of communications, running, errors, and power.
Environmental operating range	-22 to 150° F (-30 to 66° C), 0 to 90% relative humidity, non-condensing.
Physical	Rugged GE C2950HF Cycoloy plastic



Overall dimensions	**A:**	5-3/16 in. (13.2 cm)
	B:	4-1/8 in. (10.5 cm)
Mounting hole dimensions	**C:**	4-7/8 in. (12.4 cm)
	D:	2-1/20 in. (5.2 cm)
	E:	3/16 in. (.5 cm)
Depth	1-9/16 in. (4 cm)	
Weight	.44 lbs (.2kg)	
BACnet support	Conforms to the Advanced Application Controller (B-AAC) Standard Device Profile as defined in ANSI/ASHRAE Standard 135-2004 (BACnet) Annex L	
Listed by	UL916 (Canadian Std C22.2 No. 205-M1983, CE, FCC Part 15 - Subpart B - Class A	

Mounting and Wiring

⚠CAUTION The boiler system needs to be completely powered down before the UPC module can be installed.

⚠CAUTION Avoid running communication wires or sensor input wires next to AC power wires or the translator's relay output wires. The resulting noise can affect the signal quality.

Common sources of noise include:

- Spark igniters
- Radio transmitter
- Variable speed drives
- Electric motors (>1hp)
- Generators
- Relays
- Transformers
- Induction heaters
- Large contactors (i.e. motor starters)
- Video display devices
- Lamp dimmers
- Fluorescent lights

To mount the UPC

The UPC needs to be mounted exterior to the boiler. See above cautions before mounting.

Screw the UPC into an enclosed panel using the mounting slots on the cover plate. Leave about 2 in. (5 cm) on each side of the translator for wiring. See mounting hole dimensions in Specifications.

To wire UPC to system

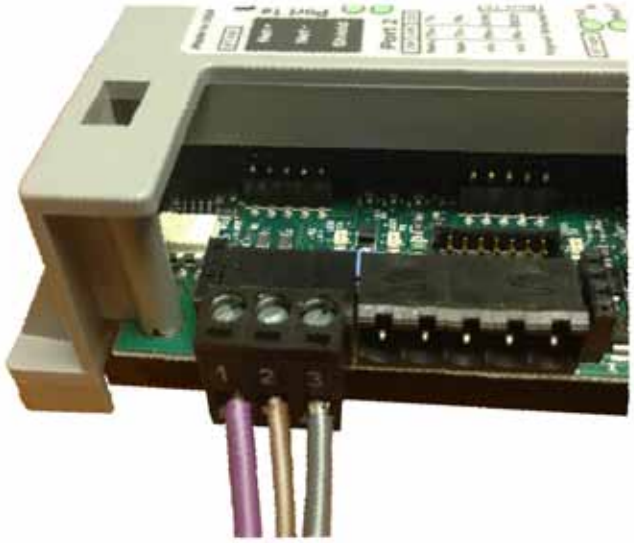
In order to properly connect to the BACnet system, the following steps need to be taken:

NOTE:

If connecting to a multiple boiler system and using (1) UPC, the "Master" boiler must be used for connection with the UPC.

1. The boiler unit(s) must be connected to Port 2 on the UPC, via a 3-wire cable from Terminal Block (F) on the SlimFit. Termination points A, B, & C on terminal block F, correspond to 1,2 & 5 on the UPC respectively. Use provided five pin connector. See below.

2. The UPC must be connected to the BAS via Port 1A. Use provided three pin connector. See below.



NOTICE Wire with Belden 8771 multi-conductor cable or equivalent.

To Configure the UPC

BACnet over MS/TP

BACnet Master Slave/Token Passing or MS/TP is used for communicating BACnet over a sub-network of BACnet-only translators. Each translator on the network has the ability to hear the broadcast of any other device on the network. The speed of an MS/TP network ranges from 9600 bps to 76.8 kbps.

NOTICE The UPC's two rotary switches determine the UPC's MAC address when it is placed on a BACnet/ARC156 or BACnet MS/TP network. The rotary switches define the MAC address portion of the device's BACnet address, which is composed of the network address and the MAC address. They also set the slave address on a Modbus network, when less than 100.

Configuring the UPC for BACnet MSTP for Port 1a

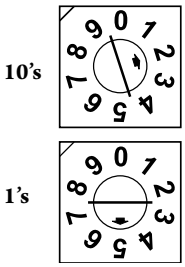
NOTICE When choosing the translator's address, the rotary switches must be set to an address othere than those of the boiler(s) in the system. The boiler(s) addresses can be found on the boiler(s) at :

Home Page →  → **Configure** → **System Idenfication & Access** → **MB2.**

1. Turn **off** the UPC's power.
2. Using the rotary switches, set the translator's address. Set the **Tens** (**10's**) switch to the tens digit of the address, and set the **Ones** (**1's**) switch to the ones digit.

   "Default Translator Address: 10"

EXAMPLE: If the translator's address is 25, point the arrow on the **Tens** (**10's**) switch to 2 and the arrow on the **Ones** (**1's**) switch to 5.



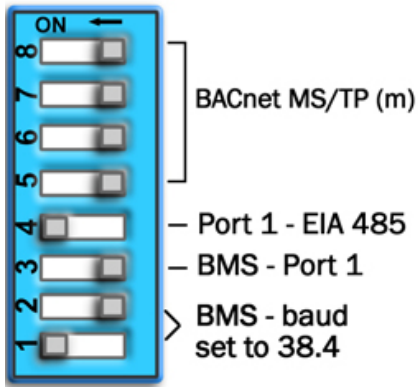
3. Set the Comm Selector DIP Switches **1 - 8** for baud rate, port number, wiring, and protocol.
4. Set DIP switches **1** and **2** for the appropriate communications speed. See table below.

NOTICE Use the same baud rate for all devices on the network segment.

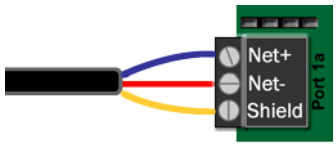
Baud Rate	DIP switch 1	DIP switch 2
9600 bps	Off	Off
19.2 kbps	Off	On
38.4 kbps	On	Off
76.8 kbps	On	On

5. Set Comm Selector DIP Switch **3** to OFF for BMS Port 1.
6. Set Comm Selector DIP Switch **4** to ON for EIA-485 2-wire.
7. Set Comm Selector DIP Switches **5 - 8** OFF for MSTP (m).

EXAMPLE: The following DIP Switches are set for 38.4k, Port 1, and MS/TP (m).



NOTICE MS/TP (m) is recommended.



8. Connect the communications wiring to Port 1a. Connect to **Net+**, **Net-**, and **Gnd**.

Wiring specifications

- A dedicated 22 AWG to 18 AWG twisted pair wire (EIA 485).
- 2000 feet (610 meters) for 76.8 kbps.
- Devices should be daisy chained and not star wired.
- If the UPC is at either end of a network segment, connect a BT485 to the UPC.

NOTICE Use the same polarity throughout the network segment.

To Configure the UPC (continued)

BACnet over ARC156

ARCnet is an embedded networking technology well-suited for real-time control applications in both the industrial and commercial marketplaces. Its robust performance and the availability of low-cost silicon make it the network of choice in BMS's.

ARC156 is a unique implementation of ARCnet. ARC156 is similar to Master Slave/Token Passing (MS/TP). The main difference between them is speed. ARC156 baud rate is 156 kbps, whereas MS/TP tops out at 76.8 kbps.

Also, ARC156 uses a separate communications co-processor to handle the network traffic and a separate processor to handle the program execution. This provides faster processing of applications and handling of communications on the network. ARC156 is the standard communications method used by our translators.

NOTICE The UPC's two rotary switches determine the UPC's MAC address when it is placed on a BACnet/ARC156 or BACnet MS/TP network. The rotary switches define the MAC address portion of the device's BACnet address, which is composed of the network address and the MAC address. They also set the slave address on a Modbus network, when less than 100.

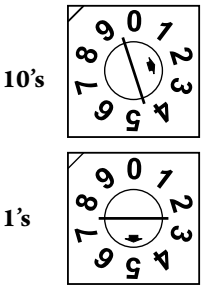
Configuring the UPC for ARC156

NOTICE When choosing the translator's address, the rotary switches must be set to an address othere than those of the boiler(s) in the system. The boiler(s) addresses can be found on the boiler(s) at :
Home Page →  → **Configure** → **System Idenfication & Access** → **MB2.**

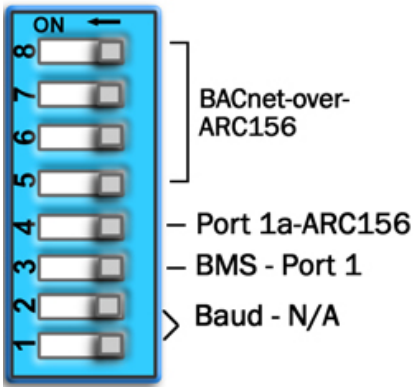
1. Turn **off** the UPC's power.
2. Using the rotary switches, set the translator's address. Set the **Tens** (**10's**) switch to the tens digit of the address, and set the **Ones** (**1's**) switch to the ones digit.

   "Default Translator Address: 10"

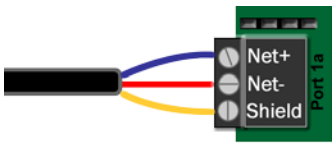
EXAMPLE: If the translator's address is 25, point the arrow on the **Tens** (**10's**) switch to 2 and the arrow on the **Ones** (**1's**) switch to 5.



3. Comm Selector DIP Switches **1-8** all OFF.



4. Port 1a is the only port that speaks BACnet over ARC156. Connect the communications wiring to Port 1a in the screw terminals labeled **Net+**, **Net-**, and **Gnd**.



Wire specifications

- 22 AWG, low-capacitance, twisted, stranded, shielded copper wire
- 2000 feet (609.60 meters) before needing a Repeater.
- If the UPC is at either end of a network segment, connect a BT485 to the UPC.

NOTICE Use the same polarity throughout the network segment.

To Configure the UPC

Modbus

The Modbus protocol is used mostly in the industrial process market to communicate between PLCs (Programmable Logic Controllers). Although there is no official standard, there is extensive documentation on Modbus and most companies who choose to interface using this protocol follow the same format.

Modbus is not a protocol that is particularly well suited for building management because of its limited master/slave structure. However, many companies offer Modbus as an open protocol solution because it is relatively easy to construct an interface.

NOTICE The UPC's two rotary switches determine the UPC's MAC address when it is placed on a BACnet/ARC156 or BACnet MS/TP network. The rotary switches define the MAC address portion of the device's BACnet address, which is composed of the network address and the MAC address. They also set the slave address on a Modbus network, when less than 100.

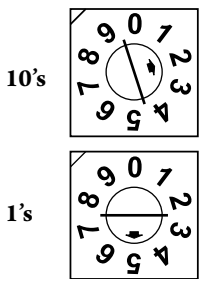
Configuring the UPC for Modbus RTU or ASCII for Port 1a

NOTICE When choosing the translator's address, the rotary switches must be set to an address othere than those of the boiler(s) in the system. The boiler(s) addresses can be found on the boiler(s) at :
Home Page → → **Configure** → **System Idenfication & Access** → **MB2.**

1. Turn **off** the UPC's power.
2. Using the rotary switches, set the translator's address. Set the **Tens** (**10's**) switch to the tens digit of the address, and set the **Ones** (**1's**) switch to the ones digit.

   "Default Translator Address: 10"

EXAMPLE: If the translator's address is 25, point the arrow on the **Tens** (**10's**) switch to 2 and the arrow on the **Ones** (**1's**) switch to 5.



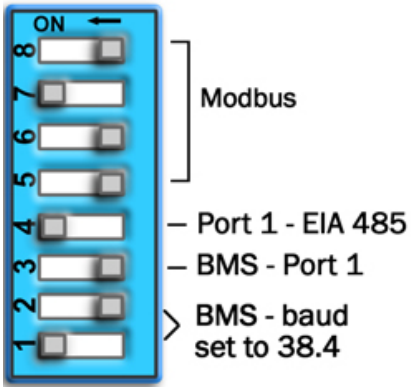
3. Set the Comm Selector DIP Switches **1** - **8** for baud rate, port number, wiring, and protocol.
4. Set DIP switches **1** and **2** for the appropriate communications speed. See table next column.

NOTICE Use the same baud rate for all devices on the network segment.

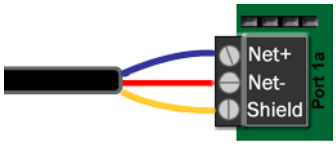
Baud Rate	DIP switch 1	DIP switch 2
9600 bps	Off	Off
19.2 kbps	Off	On
38.4 kbps	On	Off
76.8 kbps	On	On

- Set Comm Selector DIP Switch **3** to OFF for BMS Port 1.
- Set Comm Selector DIP Switches **5** - **8** OFF for Modbus.

The following example shows DIP Switches are set for 38.4k, Port 1, and Modbus.



5. Connect the communications wiring to Port 1a. Connect to **Net+**, **Net-**, and **Gnd**.



Wiring specifications

- A dedicated 24 AWG to 18 AWG twisted pair wire (EIA-485)
- 2000 feet (610 meters) for 76.8 kbps
- 3000 feet (914.4 meters) for 9600 bps, 19.2 or 38.4 kbps, before needing a Repeater
- Devices should be daisy chained and not star wired
- f the translator is at either end of a network segment, connect a BT485 to the UPC

NOTICE Use the same polarity throughout the network segment.

To Setup Sola Gateway

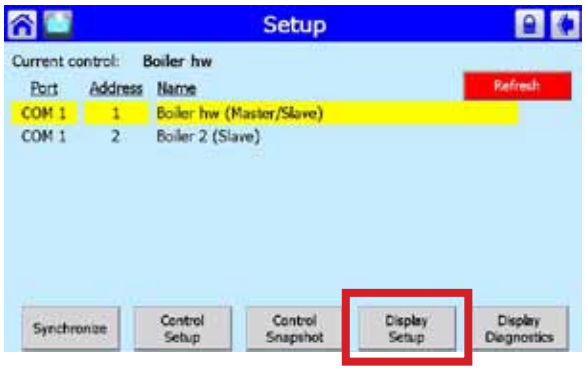
NOTE: The following steps **should only** be taken on the boiler to which the UPC is connected.

In order for the SlimFit to communicate to the Building Automation System, through the UPC, additional setup steps are needed on the boilers Sola control. See below for the steps needed to set up the Sola gateway. The example here details a connection to the "Master" boiler in a lead/lag system. However the same steps can be followed for connections single boiler systems as well.

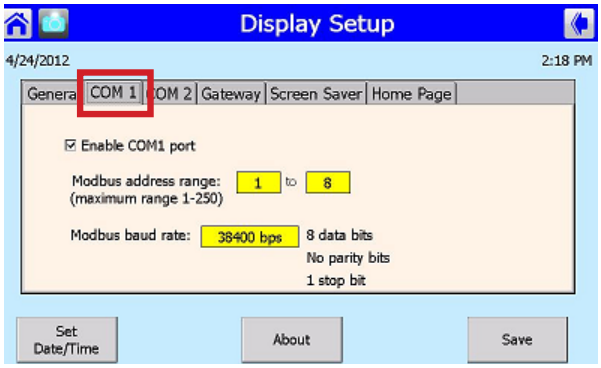
1. **Home screen select <Setup>**

   The COM ports are not restricted to a specific device or function. They can be connected to the SOLA controls or the Modbus gateway for BAS. The S7999D display is not a controller and therefore does not have an address. It provides the path for information flow from the controllers to the gateway. In the following example we have chosen to use COM 1 for the Sola controller and COM 2 for the Gateway.

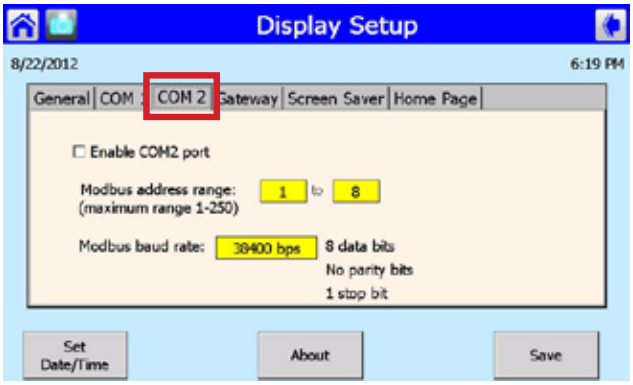
2. Select the < Display Setup > to enter the setup for COM Ports and Gateway



3. Select the < COM 1 > tab and select < Enable COM 1 port > Modbus baud rate box defaults to 38400 bps which is the correct baud rate for the Sola Controller. (J3 –MB1 or MB2).

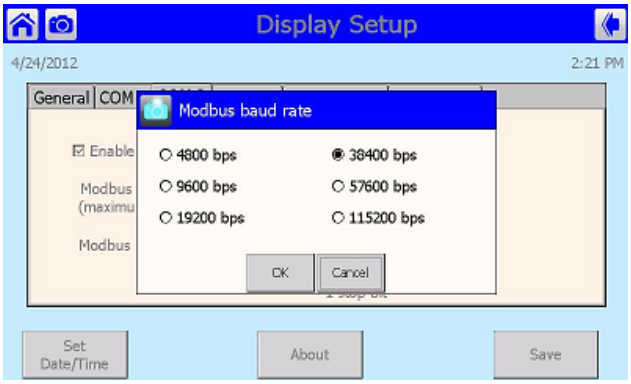


4. Select < COM 2 > tab and select < Enable COM 2 port > This will be the COM port for the gateway .

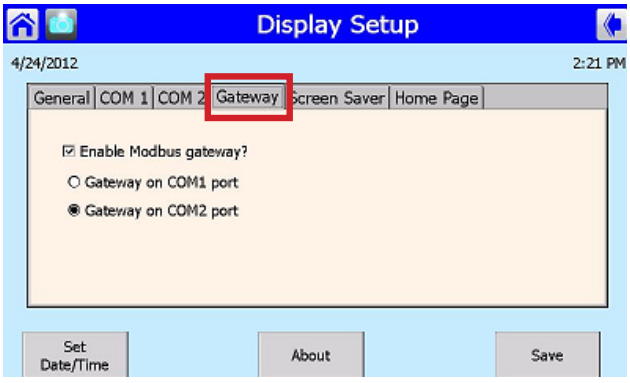


Ensure the Modbus baud rate matches the gate way requirements.

To change it select < 38400 bps > Then select the appropriate baud rate.

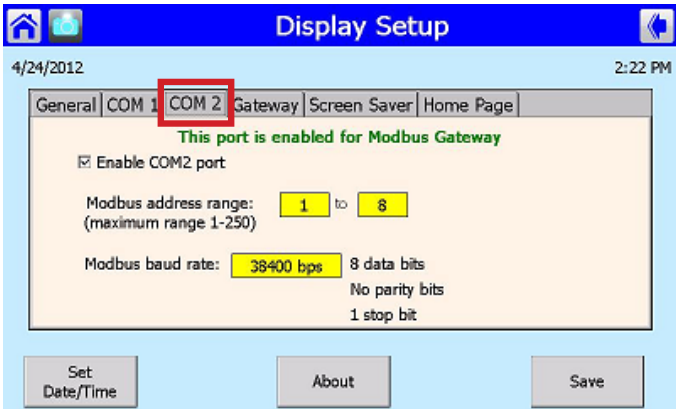


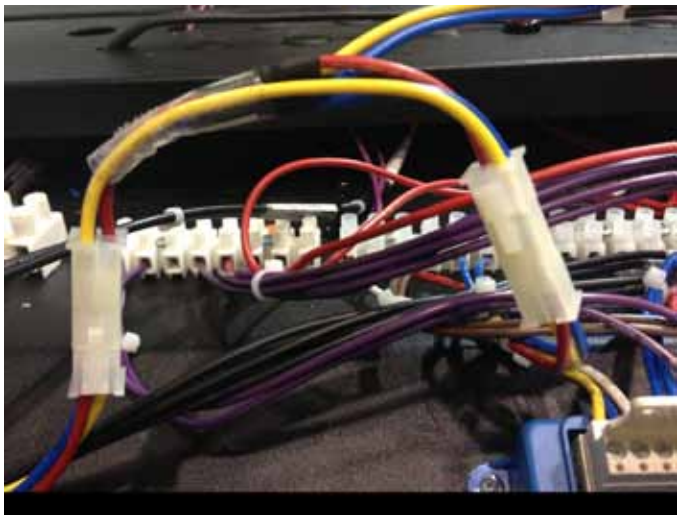
5. Select < Gateway > tab and select < Enable Modbus gateway > and also select the radio button < Gateway on COM 2 port >



NOTICE Do **Not** enable "Gateway" on COM1, this will cause errors.

Once the gateway is enabled select < COM 2 > to see confirmation that the port is enabled.





To power the UPC

⚠CAUTION

- The UPC is powered by a Class 2 power source. Take appropriate isolation measures when mounting it in a control panel where non-Class 2 circuits are present.
- Do not power pilot relays from the same transformer that powers the UPC.
- OEMCtrl translators can share a power supply as long as you:
  - Maintain the same polarity
  - Use the power supply only for OEMCtrl translators
- The UPC has an operating range of 21.6 Vac to 26.4 Vac. If voltage measured at the UPC's input terminals is outside this range, the UPC may not work properly.

The UPC must be powered by a 24V, category 2 source. A jumper harness has been provided in the UPC BACnet Kit. This harness is equipped with two 4 pin connectors that provide a jumper to be placed between the C4 connections. This connection can be found at the top left of the Sola control in the boiler's electrical enclosure (see images below). At the other end, the harness provides two power leads for the UPC.

NOTICE Additional field wiring is necessary if harness leads are not long enough to connect directly to the UPC module. All field wiring must meet local, state, and national electrical codes.

Start-up

The boiler/boiler system is now ready to turn on. Follow all startup and operational procedures as found in the SlimFit boiler manual.

Altering Data Points on SlimFit

In order to manipulate specific points on an individual boiler or boiler system, the boiler that the UPC is connected to needs to be unlocked. Follow the steps below in order to lock and unlock the boiler.

1. BACnet object 101, Password (W), needs to have the number "29542" written to it from the BAS in order for the boiler to be unlocked.
2. To relock the boiler, the number "0" needs to be written to the same BACnet point. Inactivity for ten minutes will also lock the boiler.

Note:

The boiler can also be unlocked directly at the boiler's display. Please follow the proper steps to lock and unlock the boiler as seen in the Boiler Manual, pg. 60.

Table 1*. Map of Recommended BACnet Communication Points.

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Active LL Setpoint Status	BAV	AV:5	active_ll_stpt_st_1	-40°- 266° F Setpoint determined by LL setpoint source	12	R
Active System Setpoint Status	BAV	AV:7	act_sys_sp_st_1	-40°- 266° F only valid for CH and DHW. Not Lead/Lag	001D	R
Alarm1 Status	BAV	AV:8	alm1_st_1	Most Recent Alert. See Table 5.	0460	R
Alarm2 Status	BAV	AV:9	alm2_st_1	2nd Newest Alert	0466	R
Alarm3 Status	BAV	AV:10	alm3_st_1	3rd Newest Alert	046C	R
Alarm4 Status	BAV	AV:11	alm4_st_1	4th Newest Alert	0472	R
Alarm5 Status	BAV	AV:12	alm5_st_1	5th Newest Alert	0478	R
Master Fan Speed Status	BAV	AV:59	fan_spd_st_1	RPM. Current speed of blower.	0008	R
Master Firing Rate Status	BAV	AV:60	firing_rate_st_1	RPM. Target speed of blower.	0009	R
Lead Boiler Address Status	BAV	AV:63	lead_boil_add_st_1	Modbus address of the first boiler that will be or was added to service Lead Lag Demand (slave must be available for firing)	321	R
Lead Lag Active Service Status	BAV	AV:64	ll_act_svc_st_1	0 = No Active Service 1 = CH or Steam 2 = DHW 3 = Mix 4 = Frost Protection 5-14 = Reserved 15 = Warm Weather Shutdown	300	R
Lead Lag CH 4mA Water Temp Status	BAV	AV:68	ll_ch_4ma_wtr_tmp_st_1	Temperature corresponding to 4mA signal input: -40°- 266° F	0230	R
Lead Lag CH 4mA Water Temp (W)	BAV	AV:67	ll_ch_4ma_wtr_tmp_w_1	Temperature corresponding to 4mA signal input: -40°- 266° F	0230	W
Lead Lag CH 20mA Water Temp Status	BAV	AV:66	ll_ch_20ma_wtr_tmp_st_1	Temperature corresponding to 20mA signal input: -40°- 266° F	0231	R
Lead Lag CH 20mA Water Temp (W)	BAV	AV:65	ll_ch_20ma_wtr_tmp_w_1	Temperature corresponding to 20mA signal input: -40°- 266° F	0231	W
Lead Lag CH Setpoint Source (W)	BAV	AV:75	ll_ch_stpt_src_w_1	0 = Local Setpoint 1 = Modbus Setpoint 2 = 4-20mA Setpoint	022D	W
Lead Lag Master Setpoint Source Status	BAV	AV:80	ll_ms_sp_src_st_1	0 = Unknown 1 = CH Setpoint 2 = CH TOD Setpoint 3 = Outdoor Reset 4 = Remote Control (4-20mA or Modbus) 7 = Outdoor Reset TOD 8 = Reserved 9 = Outdoor Boost	00A2	R

* If a BACnet object value reads above 6,000, the associated parameter is currently un-configured in the system. In order to configure the desired parameter, see Boiler Manual. If problem persists, please call Weil-McLain Technical Support at 1-800-526-6636.

Table 1*. Map of Recommended BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Lead Lag Mater Status	BAV	AV:81	ll_ms_st_1	0=Unknown 1=Disabled 2=Normal 3=Suspended	00A0	R
Lead Lag Setpoint Status	BAV	AV:85	ll_stpt_st_1	-40°- 190° F Default: 170	0222	R
Lead Lag Setpoint (W)	BAV	AV:84	ll_stpt_w_1	-40°- 190° F Default: 170	0222	W
Lockout Status	BAV	AV:90	lock_out_cd_st_1	0=No lockout 1-4096 (see Table 3)	0022	R
Lockout1 Status	BAV	AV:91	lock_out1_st_1	Most Recent Lockout. See Table 3.	0360	R
Lockout2 Status	BAV	AV:92	lock_out2_st_1	2nd Newest Lockout. See Table 3.	0371	R
Lockout3 Status	BAV	AV:93	lock_out3_st_1	3rd Newest Lockout. See Table 3.	0382	R
Lockout4 Status	BAV	AV:94	lock_out4_st_1	4th Newest Lockout. See Table 3.	0393	R
Lockout5 Status	BAV	AV:95	lock_out5_st_1	5th Newest Lockout. See Table 3.	03A4	R
Outdoor Sensor State Status	BAV	AV:98	otdr_sens_state_ st_1	0 = None 1 = Normal 2 = Open 3 = Shorted 4 = Outside High Range 7 = Outside Low Range 8 = No Reliable	00AB	R
Outdoor Temperature Status	BAV	AV:99	outdoor_tmp_st_1	-40°- 266° F	00AA	R
Password (W)	BAV	AV:101	pswd_w_1	Variable Length Password String (up to 20 characters) requesting ICP permis-sion to write registers	177	W
PSWD Status	BAV	AV:102	pswd_st_1	Register Data Write Access Status: 0 = No register writes allowed 1 = Installer register writes allowed 2 = OEM register writes allowed 3 = All register writes allowed	19	R
S5 (Header) Sensor Status	BAV	AV:103	s5_hdr_sens_ st_1	-40°- 266° F	000D	
Slave 1 Firing Rate Status	BAV	AV:104	sl1_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	0304	R

* If a BACnet object value reads above 6,000, the associated parameter is currently un-configured in the system. In order to configure the desired parameter, see Boiler Manual. If problem persists, please call Weil-McLain Technical Support at 1-800-526-6636.

Table 1*. Map of Recommended BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Slave 1 State Status	BAV	AV:105	sl1_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	0302	R
Slave 2 Firing Rate Status	BAV	AV:106	sl2_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	308	R
Slave 2 State Status	BAV	AV:107	sl2_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	306	R
Slave 3 Firing Rate Status	BAV	AV:108	sl3_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	030C	R
Slave 3 State Status	BAV	AV:109	sl3_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	030A	R
Slave 4 Firing Rate Status	BAV	AV:110	sl4_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	310	R
Slave 4 State Status	BAV	AV:111	sl4_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	030E	R
Slave 5 Firing Rate Status	BAV	AV:112	sl5_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	314	R
Slave 5 State Status	BAV	AV:113	sl5_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	312	R

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Table 1*. Map of Recommended BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Slave 6 Firing Rate Status	BAV	AV:114	sl6_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	318	R
Slave 6 State Status	BAV	AV:115	sl6_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	316	R
Slave 7 Firing Rate Status	BAV	AV:116	sl7_fire_rate_1	Current firing rate (0-100%) of slave 1	031C	R
Slave 7 State Status	BAV	AV:117	sl7_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	031A	R
Slave 8 Firing Rate Status	BAV	AV:118	sl8_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	320	R
Slave 8 State Status	BAV	AV:119	sl8_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	031E	R
HTemp HI Alarm	BALM	BV:13	htmp_hi_alm_1	Header Sensor High Temperature Alarm Default to 220°.		R
HTemp Low Alarm	BALM	BV:14	htemp_low_ alm_1	Header Sensor Low Temperature Alarm Default to -80°.		R
ODRTemp Hi Alarm	BALM	BV:17	ordtemp_hi_ alm_1	Outdoor Sensor High Temperature Alarm Default to 220°.		R
ORDTemp Low Alarm	BALM	BV:18	ordtemp_lo_ alm_1	Outdoor Sensor Low Temperature Alarm Default to -80°.		R

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Table 2*. Complete Map of BACnet Communication Points.

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Writer
4-20mA Remote Control Input Status	BAV	AV:1	remt_ctrl_in_4_20_st_1	4-20 mA (0.1 mA precision)	000F	R
Active CH Setpoint	BAV	AV:2	active_ch_stpt_st_1	-40°- 266° F Setpoint determined by CH setpoint source	0010	R
Active DHW Setpoint Status	BAV	AV:3	active_dhw_stpt_st_1	-40°- 266° F Setpoint determined by DHW setpoint source	0011	R
Active LL Operating Point Status	BAV	AV:4	active_ll_oppt_st_1	-40°- 266° F	001B	R
Active LL Setpoint Status	BAV	AV:5	active_ll_stpt_st_1	-40°- 266° F Setpoint determined by LL setpoint source	0012	R
Active System Operating Point Status	BAV	AV:6	act_sys_op_st_1	-40°- 266° F	001C	R
Active System Setpoint Status	BAV	AV:7	act_sys_sp_st_1	-40°- 266° F only valid for CH and DHW. Not Lead/Lag	001D	R
Alarm Record 1 Status	BAV	AV:8	alarm_st_1	Most Recent Alert. See Table 5.	0460	R
Alarm Record 2 Status	BAV	AV:9	alarm_st_2	2nd Newest Alert	0466	R
Alarm Record 3 Status	BAV	AV:10	alarm_st_3	3rd Newest Alert	046C	R
Alarm Record 4 Status	BAV	AV:11	alarm_st_4	4th Newest Alert	0472	R
Alarm Record 5 Status	BAV	AV:12	alarm_st_5	5th Newest Alert	0478	R
Annunciator First Out Status	BAV	AV:13	ann_first_out_st_1	Source for annunciator first out: 0=None or undetermined 1=ILK 2=PII 11=Annunciator 1 12=Annunciator 2 13=Annunciator 3 14=Annunciator 4 15=Annunciator 5 16=Annunciator 6 17=Annunciator 7 18=Annunciator 8	0024	R
Auxiliary 2 Pump Cycle Count	BAV	AV:14	aux2_pum_cy_cnt_1	0-999,999	0092-0093	W
Auxiliary 2 Pump Cycle Count Status	BAV	AV:15	aux2_pum_cy_cnt1_st_1	0-999,999	0092-0093	R
Auxiliary Pump Cycle Count	BAV	AV:16	aux_pum_cy_cnt_1	0-999,999	008C-008D	W
Auxiliary Pump Cycle Count Status	BAV	AV:17	aux_pum_cy_cnt1_st_1	0-999,999	008C-008D	R

* If a BACnet object value reads above 6,000, the associated parameter is currently un-configured in the system. In order to configure the desired parameter, see Boiler Manual. If problem persists, please call Weil-McLain Technical Support at 1-800-526-6636.

Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Boiler Pump Cycle Count	BAV	AV:18	blr_pum_cy_ cnt1_1	0-999,999	008A-008B	W
Boiler Pump Cycle Count Status	BAV	AV:19	blr_pum_cy_ cnt1_st_1	0-999,999	008A-008B	R
Burner Control State Status	BAV	AV:20	brnr_ctrl_state _st_1	Burner control sequence (I/O) state (see Table 6).	0021	R
Burner Control Status	BAV	AV:21	brnr_ctl_st_1	1=Locked out 4=Anti-short cycle, 5=Unconfigured safety data 34=Standby Hold 35=Standby Delay 48=Normal Standby 49=Preparing 50=Ignition 51=Firing 52=Postpurge	0020	R
Burner Cycle Count	BAV	AV:22	brn_cy_cnt_1	0-999,999	0080-0081	W
Burner Cycle Count Status	BAV	AV:23	brn_cy_cnt1_ st_1	0-999,999	0080-0081	R
Burner Run Time	BAV	AV:24	brn_run_tim_1	Hours	0082-0083	W
Burner Run Time Status	BAV	AV:25	brn_run_tim1 st_1	Hours	0082-0083	R
CH Burner Demand Status	BAV	AV:26	ch_brn_dem_ st_1	0 = Off 1 = On	0043	R
CH Heat Demand Status	BAV	AV:27	ch_heat_dem_ st_1	0 = Off 1 = On	0042	R
CH ODR Low Water Temperature (W)	BAV	AV:28	ch_odr_low_ wtr_w_1	60°- 199° F	0514	W
CH ODR Low Water Temperature Status	BAV	AV:29	ch_odr_low_ wtr_st_1	60°- 199° F	0514	R
CH ODR Max Outdoor Temperature (W)	BAV	AV:30	ch_odr_max_ tmp_w_1	50°- 100° F	0512	W
CH ODR Max Outdoor Temperature Status	BAV	AV:31	ch_odr_max_ tmp_st_1	50°- 100° F	0512	R

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Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
CH ODR Min Outdoor Temp (W)	BAV	AV:32	ch_odr_min_ temp_w_1	-40°- 100° F	0513	W
CH ODR Min Outdoor Temp Status	BAV	AV:33	ch_odr_min_ temp_st_1	-40°- 100° F	0513	R
CH Pump Cycle Count	BAV	AV:34	ch_pum_cy_ cnt_1	0-999,999	0084-0085	W
CH Pump Cycle Count Status	BAV	AV:35	ch_pum_cy_ cnt1_st_1	0-999,999	0084-0085	R
CH Requested Rate Status	BAV	AV:36	ch_req_rate_ st_1	Percentage (%)	0044	R
CH Setpoint (W)	BAV	AV:37	ch_stpt_w_1	70°- 190° F Default: 180	00D3	W
CH Setpoint Status	BAV	AV:39	ch_stpt_st_1	70°- 190° F Default: 180	00D3	R
CH Setpoint Source Status	BAV	AV:38	ch_sp_src_st_1	0 = Unknown 1 = Normal Setpoint 2 = TOD Setpoint 3 = Outdoor Reset 4 = Remote Control 7 = Outdoor Reset TOD 8 = Reserved 9 = Outdoor Boost	0041	R
CH Status	BAV	AV:40	ch_st_1	0 = Unknown 1 = Disabled 2 = Normal 3 = Suspended	0040	R
CH Time of Day Setpoint (W)	BAV	AV:41	ch_tod_ stpt_w_1	70°- 190° F Default: 160	00D4	W
CH Time of Day Setpoint Status	BAV	AV:42	ch_tod_stpt_ st_1	70°- 190° F Default: 160	00D4	W
Controller Cycle Count Status	BAV	AV:43	cont_cy_cnt1_ st_1	0-999,999	008E-008F	R
Controller Run Time Status	BAV	AV:44	cont_run_tim1_ st_1	Hours	0090-0091	R

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Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Demand Source Status	BAV	AV:45	demand_src_ st_1	Current demand source: 0=Unknown 1=No source demand 2=CH 3=DHW 4=Lead Lag slave 5=Lead Lag master 6=CH frost protection 7=DHW frost protection 8=No demand due to burner switch (register 199) turned off 9=DHW storage 10=Reserved 11=Warm weather shutdown	0006	R
DHW Burner Demand Status	BAV	AV:47	dhw_brn_dem_ st_1	0=Off 1=On	0054	R
DHW Heat Demand Status	BAV	AV:48	dhw_heat_ dem_st_1	0=Off 1=On	0053	R
DHW Priority Count Status	BAV	AV:49	dhw_pri_cnt_ st_1	Countdown of time when DHW has priority over CH (secs). Applicable when DHW priority time is enabled.	0052	R
DHW Pump Cycle Count	BAV	AV:50	dhw_pum_cy_ cnt_1	0-999,999	0086-0087	W
DHW Pump Cycle Count Status	BAV	AV:51	dhw_pum_cy_ cnt1_st_1	0-999,999	0086-0087	R
DHW Sensor Status	BAV	AV:52	dhw_sens_st_1	120°- 190° F	000C	R
DHW Setpoint	BAV	AV:53	dhw_stpt_w_1	120°- 190° F Default: 190	00D4	W
DHW Setpoint Status	BAV	AV:55	dhw_stpt_st_1	120°- 190° F Default: 190	00D4	R
DHW Setpoint Source Status	BAV	AV:54	dhw_sp_src_ st_1	0 = Unknown 1 = Normal Setpoint 2 = TOD Setpoint 3 = DHW Tap Setpoint 4 = DHW Preheat Setpoint	0051	R
DHW Status	BAV	AV:46	dhw_st_1	0 = Unknown 1 = Disabled 2 = Normal 3 = Suspended	0050	R

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Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
DHW Time of Day Setpoint (W)	BAV	AV:56	dhw_tod_ stpt_w_1	120°- 190° F Default: 180	01C6	W
DHW Time of Day Setpoint Status	BAV	BV:57	dhw_tod_stpt_ st_1	120°- 190° F Default: 180	01C6	R
DWH Requested Rate Status	BAV	AV:58	dhw_req_rate_ st_1	RPM	0055	R
Fan Speed Status	BAV	AV:59	fan_spd_st_1	RPM. Current speed of blower.	0008	R
Firing Rate Status	BAV	AV:60	firing_rate_st_1	RPM. Target speed of blower.	0009	R
Flame Signal Status	BAV	AV:61	flame_sig_st_1	Volts	000A	R
Inlet Sensor Status	BAV	AV:62	inlet_sens_st_1	-40°- 266° F	000B	R
Lead Boiler Address Status	BAV	AV:63	lead_boil_add_ st_1	Modbus address of the first boiler that will be or was added to service Lead Lag Demand (slave must be available for firing)	0321	R
Lead Lag Active Service Status	BAV	AV:64	ll_act_ svc_st_1	0 = No Active Service 1 = CH or Steam 2 = DHW 3 = Mix 4 = Frost Protection 5-14 = Reserved 15 = Warm Weather Shutdown	0300	R
Lead Lag CH 4mA Water Temp (W)	BAV	AV:67	ll_ch_4ma_wtr_ tmp_w_1	Temperature corresponding to 4mA signal input: -40°- 266° F	0230	W
Lead Lag CH 4mA Water Temp Status	BAV	AV:68	ll_ch_4ma_wtr_ tmp_st_1	Temperature corresponding to 4mA signal input: -40°- 266° F	0230	R
Lead Lag CH 20mA Water Temp (W)	BAV	AV:65	ll_ch_20ma_ wtr_tmp_w_1	Temperature corresponding to 20mA signal input: -40°- 266° F	0231	R
Lead Lag CH 20mA Water Temp Status	BAV	AV:66	ll_ch_20ma_ wtr_tmp_st_1	Temperature corresponding to 20mA signal input: -40°- 266° F	0231	R
Lead Lag CH ODR Low Water Temperature (W)	BAV	AV:69	ll_odr_low_ wtr_tmp_w_1	60°- 190° F	0519	W
Lead Lag CH ODR Low Water Temperature Status	BAV	AV:70	ll_odr_low_ wtr_tmp_st_1	60°- 190° F	0519	R
Lead Lag CH ODR Max Outdoor Temperature (W)	BAV	AV:71	ll_odr_max_ tmp_w_1	50°- 100° F	0517	W

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Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Lead Lag CH ODR Max Outdoor Temperature Status	BAV	AV:72	ll_odr_max_ tmp_st_1	50°- 100° F	0517	R
Lead Lag CH ODR Min Outdoor Temperature (W)	BAV	AV:73	ll_odr_min_ tmp_w_1	-40°- 100° F	0518	W
Lead Lag CH ODR Min Outdoor Temperature Status	BAV	AV:74	ll_odr_min_ tmp_st_1	-40°- 100° F	0518	R
Lead Lag CH Setpoint Source (W)	BAV	AV:75	ll_ch_stpt_ src_w_1	0 = Local Setpoint 1 = Modbus Setpoint 2 = 4-20mA Setpoint	022D	W
Lead Lag CH Setpoint Source Status	BAV	AV:76	ll_ch_spt_ src_w_st_1	0 = Local Setpoint 1 = Modbus Setpoint 2 = 4-20mA Setpoint	022D	R
Lead Lag DHW Setpoint	BAV	AV:77	ll_dhw_setp_1	120°- 190° F Default: 190	02C1	W
Lead Lag DHW Setpoint Status	BAV	AV:78	ll_dhw_sp_st_1	120°- 190° F Default: 190	02C1	R
Lead Lag Master Enable Status	BAV	AV:79	ll_ms_en_st_1	0 = Not a Lead/Lag Master 1 = Lead/Lag Master	0221	R
Lead Lag Master Setpoint Source Status	BAV	AV:80	ll_ms_sp_src_ st_1	0 = Unknown 1 = CH Setpoint 2 = CH TOD Setpoint 3 = Outdoor Reset 4 = Remote Control (4-20mA or Modbus) 7 = Outdoor Reset TOD 8 = Reserved 9 = Outdoor Boost	00A2	R
Lead Lag Mater Status	BAV	AV:81	ll_ms_st_1	0=Unknown 1=Disabled 2=Normal 3=Suspended	00A0	R
Lead Lag Modulation Backup Sensor	BAV	AV:82	ll_mod_bu_ sens_w_1	Backup Sensor Used for Lead/Lag Modulation: 0 = No Backup Sensor 1 = Outlet Sensor from Lead Boiler 2 = Average Outlet Sensor from All Slave Boilers	022F	W
Lead Lag Modulation Backup Sensor Status	BAV	AV:83	ll_mod_bu_ sens_st_1	Backup Sensor Used for Lead/Lag Modulation: 0 = No Backup Sensor 1 = Outlet Sensor from Lead Boiler 2 = Average Outlet Sensor from All Slave Boilers	022F	R
Lead Lag Setpoint (W)	BAV	AV:84	ll_stpt_w_1	70°- 190° F Default: 170	0222	W

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Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Lead Lag Setpoint Status	BAV	AV:85	ll_stpt_st_1	70°- 190° F Default: 170	0222	R
Lead Lag Slave Enable Status	BAV	AV:86	ll_sl_en_st_1	0 = Lead/Lag Slave Disabled 1 = Lead/Lag Simple Slave Enabled for EnviraCom Master 2 = Lead/Lag Simple Slave Enabled for Sola Modbus Master (BAS) 3 = Lead/Lag Full Slave Enabled for Sola Master	0220	R
Lead Lag Slave Status	BAV	AV:87	ll_sl_st_1	Bit map: 15=Slave command received 14=Slave mode has priority over CH & DHW 13=Slave is modulating 12=CH frost protection request 11=DHW frost protection request 10=Frost protection burner request 9=Local frost protection request 8=Reserved (always 0) 7-0=Burner control status (see register 32)	00A1	R
Lead Lag Time of Day Setpoint (W)	BAV	AV:88	ll_tod_ stpt_w_1	32°- 250° F Default: 160	0223	W
Lead Lag Time of Day Setpoint Status	BAV	AV:89	ll_tod_stpt_ st_1	32°- 250° F Default: 160	0223	R
Lockout1 Status	BAV	AV:91	lock_out1_st_1	Most Recent Lockout. See Table 3.	0360	R
Lockout2 Status	BAV	AV:92	lock_out2_st_1	2nd Newest Lockout. See Table 3.	0371	R
Lockout3 Status	BAV	AV:93	lock_out3_st_1	3rd Newest Lockout. See Table 3.	0382	R
Lockout4 Status	BAV	AV:94	lock_out4_st_1	4th Newest Lockout. See Table 3.	0393	R
Lockout5 Status	BAV	AV:95	lock_out5_st_1	5th Newest Lockout. See Table 3.	03A4	R
Lockout Status	BAV	AV:90	lock_out_cd_ st_1	0=No lockout 1-4096 (see Table 3)	0022	R
Outdoor Frost Protection Setpoint (W)	BAV	AV:96	od_fp_ stpt_w_1	-40°-266° F Default: 32	0212	W

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Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Outdoor Frost Protection Setpoint Status	BAV	AV:97	od_fp_stpt_st_1	-40°-266° F Default: 32	0212	R
Outdoor Sensor State Status	BAV	AV:98	otdr_sens_ state_st_1	0 = None 1 = Normal 2 = Open 3 = Shorted 4 = Outside High Range 7 = Outside Low Range 8 = No Reliable	00AB	R
Outdoor Temperature Status	BAV	AV:99	outdoor_tmp_ st_1	-40°-266° F	00AA	R
Outlet Sensor Status	BAV	AV:100	outlet_sens_ st_1	-40°-266° F	0007	R
Password (W)	BAV	AV:101	pswd_w_1	Variable Length Password String (up to 20 characters) requesting ICP permission to write registers	177	W
PSWD Status	BAV	AV:102	pswd_st_1	Register Data Write Access Status: 0 = No register writes allowed 1 = Installer register writes allowed 2 = OEM register writes allowed 3 = All register writes allowed	19	R
S5 (Header) Sensor Status	BAV	AV:103	s5_hdr_sens_ st_1	-40°-266° F	000D	
Slave 1 Firing Rate Status	BAV	AV:104	sl1_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	0304	R
Slave 1 State Status	BAV	AV:105	sl1_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	0302	R
Slave 2 Firing Rate Status	BAV	AV:106	sl2_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	0308	R
Slave 2 State Status	BAV	AV:107	sl2_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	0306	R

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Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Slave 3 Firing Rate Status	BAV	AV:108	sl3_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	030C	R
Slave 3 State Status	BAV	AV:109	sl3_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	030A	R
Slave 4 Firing Rate Status	BAV	AV:110	sl4_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	0310	R
Slave 4 State Status	BAV	AV:111	sl4_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	030E	R
Slave 5 Firing Rate Status	BAV	AV:112	sl5_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	0314	R
Slave 5 State Status	BAV	AV:113	sl5_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	0312	R
Slave 6 Firing Rate Status	BAV	AV:114	sl6_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	0318	R
Slave 6 State Status	BAV	AV:115	sl6_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	0316	R

* If a BACnet object value reads above 6,000, the associated parameter is currently un-configured in the system. In order to configure the desired parameter, see Boiler Manual. If problem persists, please call Weil-McLain Technical Support at 1-800-526-6636.

Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
Slave 7 Firing Rate Status	BAV	AV:116	sl7_fire_rate_1	Current firing rate (0-100%) of slave 1	031C	R
Slave 7 State Status	BAV	AV:117	sl7_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	031A	R
Slave 8 Firing Rate Status	BAV	AV:118	sl8_fire_rate_ st_1	Current firing rate (0-100%) of slave 1	0320	R
Slave 8 State Status	BAV	AV:119	sl8_state_st_1	0=Slave is unknown 1=Available 2=Add stage 3=Suspend stage 4=Firing 5=On leave 6=Disabled 7=Recovering	031E	R
Stack Sensor Status	BAV	AV:120	stack_sens_ st_1	-40°-266° F	000E	R
System Pump Cycle Count	BAV	AV:121	sys_pum_cy_ cnt_1	0-999,999	0088-0089	W
System Pump Cycle Count Status	BAV	AV:122	sys_pum_cy_ cnt1_st_1	0-999,999	0088-0089	R
Warm Weather Shutdown Setpoint	BAV	AV:123	ww_sd_ stpt_w_1	-40°-266° F Default: 60	0274	W
Warm Weather Shutdown Setpoint Status	BAV	AV:124	ww_sd_stpt_ st_1	-40°-266° F Default: 60	0274	R
CH Enable (W)	BBV	BV:1	ch_enbl_1	0 = Disable Central Heating 1 = Enable Central Heating	00D0	W
CH Enable Status	BBV	BV:2	ch_enable_ st_1	0 = Disable Central Heating 1 = Enable Central Heating	00D0	R
CH Frost Protection Enable (W)	BBV	BV:3	ch_fp_en_w_1	0 = Disable CH Frost Protection 1 = Enable CH Frost Protection	0210	W
CH Frost Protection Enable Status	BBV	BV:4	ch_frost_en_ st_1	0 = Disable CH Frost Protection 1 = Enable CH Frost Protection	0210	R
CH Outdoor Reset Enable (W)	BBV	BV:5	ch_odr_ en_w_1	0 = Disable Outdoor Reset 1 = Enable Outdoor Reset	00D7	W
CH Outdoor Reset Enable Status	BBV	BV:6	ch_odr_en_ st_1	0 = Disable Outdoor Reset 1 = Enable Outdoor Reset	00D7	R

* If a BACnet object value reads above 6,000, the associated parameter is currently un-configured in the system. In order to configure the desired parameter, see Boiler Manual. If problem persists, please call Weil-McLain Technical Support at 1-800-526-6636.

Table 2*. Complete Map of BACnet Communication Points. (continued)

Parameter	Type	Object ID	Object Name	Description	Modbus Address (Hex)	Read/ Write
CH Remote Stat (W)	BBV	BV:8	ch_rem_stat_1	0 = No Remote Stat Demand 1 = Remote Stat Demand Indicated	002A	W
CH Remote Status	BBV	BV:7	ch_rmt_st_1	0 = No Remote Stat Demand 1 = Remote Stat Demand Indicated	002A	R
DHW Enable	BBV	BV:9	dhw_en_1	0 = DHW Disabled 1 = DHW Enabled	01C0	W
DHW Enable Status	BBV	BV:10	dhw_en_st_1	0 = DHW Disabled 1 = DHW Enabled	01C0	R
DHW Frost Protection Enable	BBV	BV:11	dhw_frst_pro_en_1	0 = Disable DHW Frost Protection 1 = Enable DHW Frost Protection	0211	W
DHW Frost Protection Enable Status	BBV	BV:12	dhw_frost_en_st_1	0 = Disable DHW Frost Protection 1 = Enable DHW Frost Protection	0211	R
Lead Lag Operation Switch (W)	BBV	BV:15	ll_op_swt_w_1	0 = Turn off Lead Lag Operation 1 = Turn on Lead Lag Operation	022B	W
Lead Lag Operation Switch Status	BBV	BV:16	ll_op_swt_st_1	0 = Turn off Lead Lag Operation 1 = Turn on Lead Lag Operation	022B	R
HTemp HI Alarm	BALM	BV:13	htmp_hi_alm_1	Header Sensor High Temperature Alarm Default to 220.		R
HTemp Low Alarm	BALM	BV:14	htemp_low_alm_1	Header Sensor Low Temperature Alarm Default to -80.		R
ODRTemp Hi Alarm	BALM	BV:17	ordtemp_hi_alm_1	Outdoor Sensor High Temperature Alarm Default to 220.		R
ORDTemp Low Alarm	BALM	BV:18	ordtemp_lo_alm_1	Outdoor Sensor Low Temperature Alarm Default to -80.		R
Warm Weather Shutdown Enable	BVV	BV:19	ww_sd_en_w	0 = Disable 1 = Shutdown After Demand has Ended 2 = Shutdown Immediately	0273	W
Warm Weather Shutdown Enable Status	BVV	BV:20	ww_ed_en_st	0 = Disable 1 = Shutdown After Demand has Ended 2 = Shutdown Immediately	0273	R

* If a BACnet object value reads above 6,000, the associated parameter is currently un-configured in the system. In order to configure the desired parameter, see Boiler Manual. If problem persists, please call Weil-McLain Technical Support at 1-800-526-6636.

Table 3. Sola lockout/hold codes

Code	Description	Note
0	None	No lockout/ hold
1	Unconfigured safety data	Lockout
2	Waiting for safety data verification	Lockout
3	Internal fault: Hardware fault	Hold
4	Internal fault: Safety Relay key feedback error	Hold
5	Internal fault: Unstable power (DCDC) output	Hold
6	Internal fault: Invalid processor clock	Hold
7	Internal fault: Safety relay drive error	Hold
8	Internal fault: Zero crossing not detected	Hold/ Lockout
9	Internal fault: Flame bias out of range	Hold/ Lockout
10	Internal fault: Invalid Burner control state	Lockout
11	Internal fault: Invalid Burner control state flag	Lockout
12	Internal fault: Safety relay drive cap short	Hold
13	Internal fault: PII shorted to ILK	Hold/ Lockout
14	Internal fault: HFS shorted to LCI	Hold/ Lockout
15	Internal fault: Safety relay test failed due to feedback ON	Lockout
16	Internal fault: Safety relay test failed due to feedback OFF	Lockout
17	Internal fault: Safety relay test failed due to feedback not OFF	Lockout
18	Internal fault: Safety relay test failed due to feedback not ON	Lockout
19	Internal fault: Safety RAM write	Lockout
20	Internal fault: Flame ripple and overflow	Hold
21	Internal fault: Flame number of sample mismatch	Hold
22	Internal fault: Flame bias out of range	Hold
23	Internal fault: Bias changed since heating cycle starts	Hold
24	Internal fault: Spark voltage stuck low or high	Hold
25	Internal fault: Spark voltage changed too much during flame sensing time	Hold
26	Internal fault: Static flame ripple	Hold
27	Internal fault: Flame rod shorted to ground detected	Hold
28	Internal fault: A/D linearity test fails	Hold
29	Internal fault: Flame bias cannot be set in range	Hold
30	Internal fault: Flame bias shorted to adjacent pin	Hold
31	Internal fault: SLO electronics unknown error	Hold
32	Internal fault: Safety Key 0	Lockout
33	Internal fault: Safety Key 1	Lockout
34	Internal fault: Safety Key 2	Lockout
35	Internal fault: Safety Key 3	Lockout
36	Internal fault: Safety Key 4	Lockout
37	Internal fault: Safety Key 5	Lockout
38	Internal fault: Safety Key 6	Lockout
39	Internal fault: Safety Key 7	Lockout
40	Internal fault: Safety Key 8	Lockout
41	Internal fault: Safety Key 9	Lockout
42	Internal fault: Safety Key 10	Lockout
43	Internal fault: Safety Key 11	Lockout
44	Internal fault: Safety Key 12	Lockout
45	Internal fault: Safety Key 13	Lockout
46	Internal fault: Safety Key 14	Lockout
47	Flame rod to ground leakage	Hold
48	Static flame (not flickering)	Hold
49	24VAC voltage low/high	Hold
50	Modulation fault	Hold
51	Pump fault	Hold
52	Motor tachometer fault	Hold
53	AC inputs phase reversed	Lockout
54	Safety GVT model ID doesn't match application's model ID	Lockout
55	Application configuration data block CRC errors	Lockout
56-57	RESERVED	
58	Internal fault: HFS shorted to IAS	Lockout
59	Internal fault: Mux pin shorted	Lockout
60	Internal fault: HFS shorted to LFS	Lockout
61	Anti short cycle	Hold
62	Fan speed not proved	Hold
63	LCI OFF	Hold
64	PII OFF	Hold/ Lockout
65	Interrupted Airflow Switch OFF	Hold/ Lockout

Table 3. Sola lockout/hold codes (continued)

Code	Description	
66	Interrupted Airflow Switch ON	Hold/ Lockout
67	ILK OFF	Hold/ Lockout
68	ILK ON	Hold/ Lockout
69	Pilot test hold	Hold
70	Wait for leakage test completion	Hold
71	Input power frequency mismatch	Lockout
72-77	RESERVED	
78	Demand lost in run	Hold
79	Outlet high limit	Hold/ Lockout
80	DHW high limit	Hold/ Lockout
81	Delta T inlet/outlet limit	Hold/ Lockout
82	Stack limit	Hold/ Lockout
83	Delta T exchanger/outlet limit	Hold/ Lockout
84	Delta T inlet/exchanger limit	Hold/ Lockout
85	Inlet/outlet inversion limit	Hold/ Lockout
86	Exchanger/outlet inversion limit	Hold/ Lockout
87	Inlet/exchanger inversion limit	Hold/ Lockout
88	Outlet T-rise limit	Hold/ Lockout
89	Exchanger T-rise limit	Hold/ Lockout
90	Heat exchanger high limit	Hold/ Lockout
91	Inlet sensor fault	Hold
92	Outlet sensor fault	Hold
93	DHW sensor fault	Hold
94	S2 (J8-6) sensor fault	Hold
95	Stack sensor fault	Hold
96	S5 (J8-11) sensor fault	Hold
97	Internal fault: A2D mismatch	Lockout
98	Internal fault: Exceeded VSNSR voltage tolerance	Lockout
99	Internal fault: Exceeded 28V voltage tolerance	Lockout
100	Pressure sensor fault	Hold
101-104	RESERVED	

Code	Description	Note
105	Flame detected out of sequence	Hold/ Lockout
106	Flame lost in MFEP	Lockout
107	Flame lost early in run	Lockout
108	Flame lost in run	Lockout
109	Ignition failed	Lockout
110	Ignition failure occurred	Hold
111	Flame current lower than WEAK threshold	Hold
112	Pilot test flame time out	Lockout
113	Flame circuit time out	Lockout
114-121	RESERVED	
122	122 Light off rate proving failed	Lockout
123	123 Purge rate proving failed Lockout	Lockout
124	High fire switch OFF	Hold
125	High fire switch stuck ON	Hold
126	Low fire switch OFF	Hold
127	Low fire switch stuck ON	Hold
128	Fan speed failed during prepurge	Hold/ Lockout
129	Fan speed failed during preignition	Hold/ Lockout
130	Fan speed failed during ignition	Hold/ Lockout
131	Fan movement detected during standby	Hold
132	Fan speed failed during run	Hold
133-135	RESERVED	
136	Interrupted Airflow Switch failed to close	Hold
137	ILK failed to close	Hold
138-142	RESERVED	
143	Internal fault: Flame bias out of range 1	Lockout
144	Internal fault: Flame bias out of range 2	Lockout
145	Internal fault: Flame bias out of range 3	Lockout
146	Internal fault: Flame bias out of range 4	Lockout
147	Internal fault: Flame bias out of range 5	Lockout

Table 3. Sola lockout/hold codes (continued)

Code	Description	Note
148	Internal fault: Flame bias out of range 6	Lockout
149	Flame detected	Hold/ Lockout
150	Flame not detected	Hold
151	High fire switch ON	Hold/ Lockout
152	Combustion pressure ON	Hold/ Lockout
153	Combustion pressure OFF	Hold/ Lockout
154	Purge fan switch ON	Hold/ Lockout
155	Purge fan switch OFF	Hold/ Lockout
156	Combustion pressure and Flame ON	Hold/ Lockout
157	Combustion pressure and Flame OFF	Lockout
158	Main valve ON	Lockout
159	Main valve OFF	Lockout
160	Ignition ON	Lockout
161	Ignition OFF	Lockout
162	Pilot valve ON	Lockout
163	Pilot valve OFF	Lockout
164	Block intake ON	Lockout
165	Block intake OFF	Lockout
166-171	RESERVED	
172	Main relay feedback incorrect	Lockout
173	Pilot relay feedback incorrect	Lockout
174	Safety relay feedback incorrect	Lockout
175	Safety relay open	Lockout
176	Main relay ON at safe start check	Lockout
177	Pilot relay ON at safe start check	Lockout
178	Safety relay ON at safe start check	Lockout
179-183	RESERVED	
184	Invalid BLOWER/HSI output setting	Lockout
185	Invalid Delta T limit enable setting	Lockout
186	Invalid Delta T limit response setting	Lockout
187	Invalid DHW high limit enable setting	Lockout
188	Invalid DHW high limit response setting	Lockout
189	Invalid Flame sensor type setting	Lockout
190	Invalid interrupted air switch enable setting	Lockout
191	Invalid interrupted air switch start check enable setting	Lockout
192	Invalid Igniter on during setting	Lockout
193	Invalid Ignite failure delay setting	Lockout
194	Invalid Ignite failure response setting	Lockout
195	Invalid Ignite failure retries setting	Lockout
196	Invalid Ignition source setting	Lockout
197	Invalid Interlock open response setting	Lockout
198	Invalid Interlock start check setting	Lockout
199	Invalid LCI enable setting	Lockout
200	Invalid light off rate setting	Lockout
201	Invalid Light off rate proving setting	Lockout
202	Invalid Main Flame Establishing Period time setting	Lockout
203	Invalid MFEP flame failure response setting	Lockout
204	Invalid NTC sensor type setting	Lockout
205	Invalid Outlet high limit response setting	Lockout
206	Invalid Pilot Flame Establishing Period setting	Lockout
207	Invalid PII enable setting	Lockout
208	Invalid pilot test hold setting	Lockout
209	Invalid Pilot type setting	Lockout
210	Invalid Postpurge time setting	Lockout
211	Invalid Power up with lockout setting	Lockout
212	Invalid Preignition time setting	Lockout
213	Invalid Prepurge rate setting	Lockout
214	Invalid Prepurge time setting	Lockout
215	Invalid Purge rate proving setting	Lockout
216	Invalid Run flame failure response setting	Lockout
217	Invalid Run stabilization time setting	Lockout
218	Invalid Stack limit enable setting	Lockout
219	Invalid Stack limit response setting	Lockout
220	Unconfigured Delta T limit setpoint setting	Lockout
221	Unconfigured DHW high limit setpoint setting	Lockout
222	Unconfigured Outlet high limit setpoint setting	Lockout

Table 3. Sola lockout/hold codes (continued)

Code	Description	Note
223	Unconfigured Stack limit setpoint setting	Lockout
224	Invalid DHW demand source setting	Lockout
225	Invalid Flame threshold setting	Lockout
226	Invalid Outlet high limit setpoint setting	Lockout
227	Invalid DHW high limit setpoint setting	Lockout
228	Invalid Stack limit setpoint setting	Lockout
229	Invalid Modulation output setting	Lockout
230	Invalid CH demand source setting	Lockout
231	Invalid Delta T limit delay setting	Lockout
232	Invalid Pressure sensor type setting	Lockout
233	Invalid IAS closed response setting	Lockout
234	Invalid Outlet high limit enable setting	Lockout
235	Invalid Outlet connector type setting	Lockout
236	Invalid Inlet connector type setting	Lockout
237	Invalid DHW connector type setting	Lockout
238	Invalid Stack connector type setting	Lockout
239	Invalid S2 (J8-6) connector type setting	Lockout
240	Invalid S5 (J8-11) connector type setting	Lockout
241	Exchanger sensor not allowed with stack connector setting	Lockout
242	Invalid DHW auto detect configuration	Lockout
243	Invalid UV with spark interference not compatible with Ignitor on throughout PFEP	Lockout
244	Internal fault: Safety relay test invalid state	Lockout
245	Invalid Outlet connector type setting for T-rise	Lockout
246	4-20mA cannot be used for both modulation and setpoint control	Lockout
247	Invalid ILK bounce detection enable	Lockout
248	Invalid forced recycle interval	Lockout
249	STAT cannot be demand source when Remote Stat is enabled	Lockout
250	Invalid Fan speed error response	Lockout
251	Lead drop-stage on error setting does not match drop method configuration	Lockout
252	Invalid Line frequency setting	Lockout
253-255	RESERVED	

Table 4. Sola alert log record

Byte Offset	Parameter	Read/ Write	*Format*	Note
0-1	Alert code	R	U16	See Table 11.
2-5	Cycle	R	U32	See registers 128-129 (decimal).
6-9	Hours	R	U32	See registers 130-131 (decimal).
10	-	R	U8	Unused
11	Occurrence count	R	U8	Number of occurrences of most recent alert.

Table 5. Sola alert codes

Code	Description
0	None (No alert)
1	Alert PCB was restored from factory defaults
2	Safety configuration parameters were restored from factory defaults
3	Configuration parameters were restored from factory defaults
4	Invalid Factory Invisibility PCB was detected
5	Invalid Factory Range PCB was detected
6	Invalid range PCB record has been dropped
7	EEPROM lockout history was initialized
8	Switched application annunciation data blocks
9	Switched application configuration data blocks
10	Configuration was restored from factory defaults
11	Backup configuration settings was restored from active configuration
12	Annunciation configuration was restored from factory defaults
13	Annunciation configuration was restored from backup
14	Safety group verification table was restored from factory defaults
15	Safety group verification table was updated
16	Invalid Parameter PCB was detected
17	Invalid Range PCB was detected
18	Alarm silence time exceeded maximum
19	Invalid safety group verification table was detected
20	Back door password could not be determined
21	Invalid safety group verification table was not accepted
22	CRC errors were found in application configuration data blocks
23	Backup Alert PCB was restored from active one
24	RESERVED
25	Lead Lag operation switch was turned OFF
26	Lead Lag operation switch was turned ON
27	Safety processor was reset
28	Application processor was reset
29	Burner switch was turned OFF
30	Burner switch was turned ON

Code	Description
31	Program Module (PM) was inserted into socket
32	Program Module (PM) was removed from socket
33	Alert PCB was configured
34	Parameter PCB was configured
35	Range PCB was configured
36	Program Module (PM) incompatible with product was inserted into socket
37	Program Module application parameter revision differs from application processor
38	Program Module safety parameter revision differs from safety processor
39	PCB incompatible with product contained in Program Module
40	Parameter PCB in Program Module is too large for product
41	Range PCB in Program Module was too large for product
42	Alert PCB in Program Module was too large for product
43	IAS start check was forced on due to IAS enabled
44	Low voltage was detected in safety processor
45	High line frequency occurred
46	Low line frequency occurred
47	Invalid subsystem reset request occurred
48	Write large enumerated Modbus register value was not allowed
49	Maximum cycle count was reached
50	Maximum hours count was reached
51	Illegal Modbus write was attempted
52	Modbus write attempt was rejected (NOT ALLOWED)
53	Illegal Modbus read was attempted
54	Safety processor brown-out reset occurred
55	Application processor watchdog reset occurred
56	Application processor brown-out reset occurred
57	Safety processor watchdog reset occurred
58	Alarm was reset by the user at the control
59	Burner control firing rate was > absolute max rate
60	Burner control firing rate was < absolute min rate

Table 5. Sola alert codes (continued)

Code	Description
61	Burner control firing rate was invalid, % vs. RPM
62	Burner control was firing with no fan request
63	Burner control rate (nonfiring) was > absolute max rate
64	Burner control rate (nonfiring) was < absolute min rate
65	Burner control rate (nonfiring) was absent
66	Burner control rate (nonfiring) was invalid, % vs. RPM
67	Fan off cycle rate was invalid, % vs. RPM
68	Setpoint was overridden due to sensor fault
69	Modulation was overridden due to sensor fault
70	No demand source was set due to demand priority conflicts
71	CH 4-20mA signal was invalid
72-73	RESERVED
74	Periodic Forced Recycle
75	Absolute max fan speed was out of range
76	Absolute min fan speed was out of range
77	Fan gain down was invalid
78	Fan gain up was invalid
79	Fan minimum duty cycle was invalid
80	Fan pulses per revolution was invalid
81	Fan PWM frequency was invalid
82-83	RESERVED
84	Lead Lag CH 4-20mA water temperature setting was invalid
85	No Lead Lag add stage error threshold was configured
86	No Lead Lag add stage detection time was configured
87	No Lead Lag drop stage error threshold was configured
88	No Lead Lag drop stage detection time was configured
89	Lead Lag all boiler off threshold was invalid
90	Modulation output type was invalid
91	Firing rate control parameter was invalid
92	Forced rate was out of range vs. min/max modulation
93	Forced rate was invalid, % vs. RPM
94	Slow start ramp value was invalid
95	Slow start degrees value was invalid
96	Slow start was ended due to outlet sensor fault
97	Slow start was end due to reference setpoint fault
98	CH max modulation rate was invalid, % vs. RPM
99	CH max modulation rate was > absolute max rate
100	CH modulation range (max minus min) was too small (< 4% or 40 RPM)
101	DHW max modulation rate was invalid, % vs. RPM
102	DHW max modulation rate was > absolute max rate
103	DHW modulation range (max minus min) was too small (< 4% or 40 RPM)
104	104 Min modulation rate was < absolute min rate
105	Min modulation rate was invalid, % vs. RPM
106	Manual rate was invalid, % vs. RPM
107	Slow start enabled, but forced rate was invalid
108	Analog output hysteresis was invalid
109	Analog modulation output type was invalid
110	IAS open rate differential was invalid
111	IAS open step rate was invalid
112	Mix max modulation rate was invalid, % vs. RPM
113	Mix max modulation rate was > absolute max or < absolute min rates
114	Mix modulation range (max minus min) was too small (< 4% or 40 RPM)
115	Fan was limited to its minimum duty cycle
116	Manual rate was > CH max modulation rate
117	Manual rate was > DHW max modulation rate
118	Manual rate was < min modulation rate
119	Manual rate in Standby was > absolute max rate
120	Modulation commanded rate was > CH max modulation rate
121	Modulation commanded rate was > DHW max modulation rate

Table 5. Sola alert codes (continued)

Code	Description
122	Modulation commanded rate was < min modulation rate
123	Modulation rate was limited due to Outlet limit
124	Modulation rate was limited due to Delta-T limit
125	Modulation rate was limited due to Stack limit
126	Modulation rate was limited due to anti-condensation
127	Fan speed out of range in RUN
128	Modulation rate was limited due to IAS was open
129	Slow start ramp setting of zero will result in no modulation rate change
130	No forced rate was configured for slow start ramp
131	CH demand source was invalid
132	CH P-gain was invalid
133	CH I-gain was invalid
134	CH D-gain was invalid
135	CH OFF hysteresis was invalid
136	CH ON hysteresis was invalid
137	CH sensor type was invalid
138	CH hysteresis step time was invalid
139	CH remote control parameter was invalid
140	CH ODR not allowed with remote control
141	Steam P-gain was invalid
142	Steam I-gain was invalid
143	Steam D-gain was invalid
144	Steam OFF hysteresis was invalid
145	Steam ON hysteresis was invalid
146	CH control was suspended due to fault
147	CH header temperature was invalid
148	CH Outlet temperature was invalid
149	CH steam pressure was invalid
150	Steam setpoint source parameter was invalid
151	Minimum water temperature parameter was greater than setpoint
152	Minimum water temperature parameter was greater than time of day setpoint
153	Minimum pressure parameter was greater than setpoint
154	Minimum pressure parameter was greater than time of day setpoint
155	CH modulation rate source parameter was invalid
156	Steam modulation rate source parameter was invalid
157	DHW demand source was invalid
158	DHW P-gain was invalid
159	DHW I-gain was invalid
160	DHW D-gain was invalid
161	DHW OFF hysteresis was invalid
162	DHW ON hysteresis was invalid
163	DHW hysteresis step time was invalid
164	DHW sensor type was invalid
165	Inlet sensor type was invalid for DHW
166	Outlet sensor type was invalid for DHW
167	DHW storage OFF hysteresis was invalid
168	DHW storage ON hysteresis was invalid
169	DHW modulation sensor type was invalid
170	DHW modulation sensor was not compatible for Auto mode
171	DHW control was suspended due to fault
172	DHW temperature was invalid
173	DHW inlet temperature was invalid
174	DHW outlet temperature was invalid
175	DHW high limit must be disabled for Auto mode
176	DHW sensor type was not compatible for Auto mode
177	DHW priority source setting was invalid
178	DHW priority method setting was invalid
179	CH S5 (J8-11) sensor was invalid
180	CH Inlet temperature was invalid
181	CH S10 (J10-7) sensor was invalid
182	Lead Lag CH setpoint source was invalid
183	Lead Lag P-gain was invalid
184	Lead Lag I-gain was invalid
185	Lead Lag D-gain was invalid
186	Lead Lag OFF hysteresis was invalid
187	Lead Lag ON hysteresis was invalid

Table 5. Sola alert codes (continued)

Code	Description
188	Lead Lag slave enable was invalid
189	Lead Lag hysteresis step time was invalid
190	No Lead Lag Modbus port was assigned
191	Lead Lag base load common setting was invalid
192	Lead Lag DHW demand switch setting was invalid
193	Lead Lag Mix demand switch setting was invalid
194	Lead Lag modulation sensor setting was invalid
195	Lead Lag backup modulation sensor setting was invalid
196	Lead Lag slave mode setting was invalid
197	Lead Lag rate allocation setting was invalid
198	Lead selection setting was invalid
199	Lag selection setting was invalid
200	Lead Lag slave return setting was invalid
201	Lead Lag add stage method setting was invalid
202	STAT may not be a Lead Lag CH demand source when Remote Stat is enabled
203	Lead Lag base load rate setting was invalid
204	Lead Lag master was suspended due to fault
205	Lead Lag slave was suspended due to fault
206	Lead Lag header temperature was invalid
207	Lead Lag was suspended due to no enabled Program Module installed
208	Lead Lag slave session has timed out
209	Too many Lead Lag slaves were detected
210	Lead Lag slave was discovered
211	Incompatible Lead Lag slave was discovered
212	No base load rate was set for Lead Lag slave
213	Lead Lag slave unable to fire before demand to fire delay expired
214	Adding Lead Lag slave aborted due to add requirement change
215	No Lead Lag slaves available to service demand
216	No Lead Lag active service was set due to demand priority conflicts
217	No Lead Lag add stage method was specified
218	No Lead Lag drop stage method was specified
219	Using backup Lead Lag header sensor due to sensor failure
220	Lead Lag frost protection rate was invalid
221	Lead Lag drop stage method setting was invalid
222	CH frost protection temperature was invalid
223	CH frost protection inlet temperature was invalid
224	DHW frost protection temperature was invalid
225-226	RESERVED
227	DHW priority override time was not derated due to invalid outdoor temperature
228	Warm weather shutdown was not checked due to invalid outdoor temperature
229	Lead Lag slave communication time out
230	RESERVED
231	Lead Lag CH setpoint was invalid
232	Lead Lag CH time of day setpoint was invalid
233	Lead Lag outdoor temperature was invalid
234	Lead Lag ODR time of day setpoint was invalid
235	Lead Lag ODR time of day setpoint exceeded normal setpoint
236	Lead Lag ODR max outdoor temperature was invalid
237	Lead Lag ODR min outdoor temperature was invalid
238	Lead Lag ODR low water temperature was invalid
239	Lead Lag ODR outdoor temperature range was too small (minimum 12°C / 22°F)
240	Lead Lag ODR water temperature range was too small (minimum 12°C / 22°F)
241	Lead Lag DHW setpoint was invalid
242	Lead Lag Mix setpoint was invalid
243	Lead Lag CH demand switch was invalid
244	Lead Lag ODR min water temperature was invalid
245	RESERVED
246	CH setpoint was invalid
247	CH time of day setpoint was invalid
248	CH outdoor temperature was invalid
249	CH ODR time of day setpoint was invalid

Table 5. Sola alert codes (continued)

Code	Description
250	CH ODR time of day setpoint exceeds normal setpoint
251	CH max outdoor setpoint was invalid
252	CH min outdoor setpoint was invalid
253	CH ODR low water temperature was invalid
254	CH ODR outdoor temperature range was too small
255	CH ODR water temperature range was too small
256	Steam setpoint was invalid
257	Steam time of day setpoint was invalid
258	Steam minimum pressure was invalid
259	CH ODR min water temperature was invalid
260	RESERVED
261	DHW setpoint was invalid
262	DHW time of day setpoint was invalid
263	DHW storage setpoint was invalid
264	STAT may not be a DHW demand source when Remote Stat is enabled
265-266	RESERVED
267	STAT may not be a CH demand source when Remote Stat is enabled
268	CH 4mA water temperature setting was invalid
269	CH 20mA water temperature setting was invalid
270	Steam 4mA water temperature setting was invalid
271	Steam 20mA water temperature setting was invalid
272	Abnormal Recycle: Pressure sensor fault
273	Abnormal Recycle: Safety relay drive test failed
274	Abnormal Recycle: Demand off during Pilot Flame Establishing Period
275	Abnormal Recycle: LCI off during Drive to Purge Rate
276	Abnormal Recycle: LCI off during Measured Purge Time
277	Abnormal Recycle: LCI off during Drive to Light off Rate
278	Abnormal Recycle: LCI off during Pre-Ignition test
279	Abnormal Recycle: LCI off during Pre-Ignition time
280	Abnormal Recycle: LCI off during Main Flame Establishing Period
281	Abnormal Recycle: LCI off during Ignition period
282	Abnormal Recycle: Demand off during Drive to Purge Rate
283	Abnormal Recycle: Demand off during Measured Purge Time
284	Abnormal Recycle: Demand off during Drive to Light off Rate
285	Abnormal Recycle: Demand off during Pre-Ignition test
286	Abnormal Recycle: Demand off during Pre-Ignition time
287	Abnormal Recycle: Flame was on during Safe Start check
288	Abnormal Recycle: Flame was on during Drive to Purge Rate
289	Abnormal Recycle: Flame was on during Measured Purge Time
290	Abnormal Recycle: Flame was on during Drive to Light off Rate
291	Abnormal Recycle: Flame was not on at end of Ignition period
292	Abnormal Recycle: Flame was lost during Main Flame Establishing Period
293	Abnormal Recycle: Flame was lost early in Run
294	Abnormal Recycle: Flame was lost during Run
295	Abnormal Recycle: Leakage test failed
296	Abnormal Recycle: Interrupted air flow switch was off during Drive to Purge Rate
297	Abnormal Recycle: Interrupted air flow switch was off during Measured Purge Time
298	Abnormal Recycle: Interrupted air flow switch was off during Drive to Light off Rate
299	Abnormal Recycle: Interrupted air flow switch was off during Pre-Ignition test
300	Abnormal Recycle: Interrupted air flow switch was off during Pre-Ignition time
301	Abnormal Recycle: Interrupted air flow switch was off during Main Flame Establishing Period
302	Abnormal Recycle: Ignition failed due to interrupted air flow switch was off
303	Abnormal Recycle: ILK off during Drive to Purge Rate
304	Abnormal Recycle: ILK off during Measured Purge Time

Table 5. Sola alert codes (continued)

Code	Description
305	Abnormal Recycle: ILK off during Drive to Light off Rate
306	Abnormal Recycle: ILK off during Pre-Ignition test
307	Abnormal Recycle: ILK off during Pre-Ignition time
308	Abnormal Recycle: ILK off during Main Flame Establishing Period
309	Abnormal Recycle: ILK off during Ignition period
310	Run was terminated due to ILK was off
311	Run was terminated due to interrupted air flow switch was off
312	Stuck reset switch
313	Run was terminated due to fan failure
314	Abnormal Recycle: Fan failed during Drive to Purge Rate
315	Abnormal Recycle: Fan failed during Measured Purge Time
316	Abnormal Recycle: Fan failed during Drive to Light off Rate
317	Abnormal Recycle: Fan failed during Pre-Ignition test
318	Abnormal Recycle: Fan failed during Pre-Ignition time
319	Abnormal Recycle: Fan failed during Ignition period
320	Abnormal Recycle: Fan failed during Main Flame Establishing Period
321	Abnormal Recycle: Main Valve off after 10 seconds of RUN
322	Abnormal Recycle: Pilot Valve off after 10 seconds of RUN
323	Abnormal Recycle: Safety Relay off after 10 seconds of RUN
324	Abnormal Recycle: Hardware flame bias
325	Abnormal Recycle: Hardware static flame
326	Abnormal Recycle: Hardware flame current invalid
327	Abnormal Recycle: Hardware flame rod short
328	Abnormal Recycle: Hardware invalid power
329	Abnormal Recycle: Hardware invalid AC line
330	Abnormal Recycle: Hardware SLO flame ripple
331	Abnormal Recycle: Hardware SLO flame sample
332	Abnormal Recycle: Hardware SLO flame bias range
333	Abnormal Recycle: Hardware SLO flame bias heat
334	Abnormal Recycle: Hardware SLO spark stuck
335	Abnormal Recycle: Hardware SLO spark changed
336	Abnormal Recycle: Hardware SLO static flame
337	Abnormal Recycle: Hardware SLO rod shorted
338	Abnormal Recycle: Hardware SLO AD linearity
339	Abnormal Recycle: Hardware SLO bias not set
340	Abnormal Recycle: Hardware SLO bias shorted
341	Abnormal Recycle: Hardware SLO electronics
342	Abnormal Recycle: Hardware processor clock
343	Abnormal Recycle: Hardware AC phase
344	Abnormal Recycle: Hardware A2D mismatch
345	Abnormal Recycle: Hardware VSNSR A2D
346	Abnormal Recycle: Hardware 28V A2D
347	Abnormal Recycle: Hardware HFS IAS shorted
348	Abnormal Recycle: Hardware PII INTLK shorted
349	Abnormal Recycle: Hardware HFS LCI shorted
350	Abnormal Recycle: Hardware HFS LFS shorted
351	Abnormal Recycle: Invalid zero crossing
352	Abnormal Recycle: fault stack sensor
353	Abnormal Recycle: stack limit
354	Abnormal Recycle: delta T limit
355	Abnormal Recycle: fault outlet sensor
356	Abnormal Recycle: outlet high limit
357	Abnormal Recycle: fault DHW sensor
358	Abnormal Recycle: DHW high limit
359	Abnormal Recycle: fault inlet sensor
360	Abnormal Recycle: Check Parameters Failed
361	Internal error: No factory parameters were detected in control
362	Internal error: PID iteration frequency was invalid
363	Internal error: Demand-Rate interval time was invalid

Table 5. Sola alert codes (continued)

Code	Description
364	Internal error: Factory calibration parameter for modulation was invalid
365	Internal error: CH PID P-scaler was invalid
366	Internal error: CH PID I-scaler was invalid
367	Internal error: CH PID D-scaler was invalid
368	Internal error: DHW PID P-scaler was invalid
369	Internal error: DHW PID I-scaler was invalid
370	Internal error: DHW PID D-scaler was invalid
371	Internal error: Lead Lag master PID P-scaler was invalid
372	Internal error: Lead Lag master PID I-scaler was invalid
373	Internal error: Lead Lag master PID D-scaler was invalid
374	Abnormal Recycle: Hardware flame bias high
375	Abnormal Recycle: Hardware flame bias low
376	Abnormal Recycle: Hardware flame bias delta high
377	Abnormal Recycle: Hardware flame bias delta low
378	Abnormal Recycle: Hardware flame bias dynamic high
379	Abnormal Recycle: Hardware flame bias dynamic low
380	Abnormal Recycle: Fan Speed Not Proven
381	Abnormal Recycle: Fan Speed Range Low
382	Abnormal Recycle: Fan Speed Range High
383-388	RESERVED
389	Abnormal Recycle: AC power frequency Mismatch
390-450	RESERVED
451	Circulator control was invalid
452	Circulator P-gain was invalid
453	Circulator I-gain was invalid
454	Circulator temperature was invalid
455	Circulator outlet temperature was invalid

Code	Description
456	Circulator inlet temperature was invalid
457	Circulator outdoor temperature was invalid
458	Circulator sensor choice was invalid
459	Circulator PID setpoint was invalid
460	LCI lost in run
461	Abnormal Recycle: Demand lost in run from application
462	Abnormal Recycle: Demand lost in run due to high limit
463	Abnormal Recycle: Demand lost in run due to no flame
464	LCI lost in Combustion Pressure Establishing Period
465	LCI lost in Combustion Pressure Stabilization Period
466	RESERVED
467	Internal error: EEPROM write was attempted before EEPROM was initialized
468	Internal error: EEPROM cycle count address was invalid
469	Internal error: EEPROM days count address was invalid
470	Internal error: EEPROM hours count address was invalid
471	Internal error: Lockout record EEPROM index was invalid
472	Internal error: Request to write PM status was invalid
473	Internal error: PM parameter address was invalid
474	Internal error: PM safety parameter address was invalid
475	Internal error: Invalid record in lockout history was removed
476	Internal error: EEPROM write buffer was full
477	Internal error: Data too large was not written to EEPROM
478	Internal error: Safety key bit 0 was incorrect
479	Internal error: Safety key bit 1 was incorrect
480	Internal error: Safety key bit 2 was incorrect
481	Internal error: Safety key bit 3 was incorrect

Table 5. Sola alert codes (continued)

Code	Description
482	Internal error: Safety key bit 4 was incorrect
483	Internal error: Safety key bit 5 was incorrect
484	Internal error: Safety key bit 6 was incorrect
485	Internal error: Safety key bit 7 was incorrect
486	Internal error: Safety key bit 8 was incorrect
487	Internal error: Safety key bit 9 was incorrect
488	Internal error: Safety key bit 10 was incorrect
489	Internal error: Safety key bit 11 was incorrect
490	Internal error: Safety key bit 12 was incorrect
491	Internal error: Safety key bit 13 was incorrect
492	Internal error: Safety key bit 14 was incorrect
493	Internal error: Safety key bit 15 was incorrect
494	Internal error: Safety relay time out
495	Internal error: Safety relay commanded off
496	Internal error: Unknown safety error occurred
497	Internal error: Safety timer was corrupt
498	Internal error: Safety timer was expired
499	Internal error: Safety timings
500	Internal error: Safety shutdown
501	RESERVED
502	Mix setpoint was invalid
503	Mix time of day setpoint was invalid
504	Mix outdoor temperature was invalid
505	Mix ODR time of day setpoint was invalid
506	Mix ODR time of day setpoint exceeds normal setpoint
507	Mix ODR max outdoor temperature was invalid
508	Mix ODR min outdoor temperature was invalid
509	Mix ODR low water temperature was invalid
510	Mix ODR outdoor temperature range was invalid
511	Mix ODR water temperature range was invalid
512	Mix demand switch was invalid
513	Mix ON hysteresis was invalid
514	Mix OFF hysteresis was invalid
515	Mix ODR min water temperature was invalid
516	Mix hysteresis step time was invalid
517	Mix P-gain was invalid
518	Mix I-gain was invalid
519	Mix D-gain was invalid
520	Mix control was suspended due to fault
521	Mix S10 (J10-7) temperature was invalid
522	Mix outlet temperature was invalid
523	Mix inlet temperature was invalid
524	Mix S5 (J8-11) temperature was invalid
525	Mix modulation sensor type was invalid
526	Mix ODR min water temperature setpoint was invalid
527	Mix circulator sensor was invalid
528	Mix flow control was invalid
529	Mix temperature was invalid
530	Mix sensor was invalid
531	Mix PID setpoint was invalid
532	STAT may not be a Mix demand source when Remote Stat is enabled
533-539	RESERVED
540	Delta T inlet/outlet enable was invalid
541	Delta T exchanger/outlet enable was invalid
542	Delta T inlet/exchanger enable was invalid
543	Delta T inlet/outlet degrees was out of range
544	Delta T exchanger/outlet degrees was out of range

Table 5. Sola alert codes (continued)

Code	Description
545	Delta T inlet/exchanger degrees was out of range
546	Delta T response was invalid
547	Delta T inversion limit response was invalid
548	Delta T rate limit enable was invalid
549	Delta T exchanger/outlet wasn't allowed due to stack limit setting
550	Delta T inlet/outlet limit was exceeded
551	Delta T exchanger/outlet limit was exceeded
552	Delta T inlet/exchanger limit was exceeded
553	Inlet/outlet inversion occurred
554	Exchanger/outlet inversion occurred
555	Inlet/exchanger inversion occurred
556	Delta T exchanger/outlet wasn't allowed due to stack connector setting
557	Delta T inlet/exchanger wasn't allowed due to stack limit setting
558	Delta T inlet/exchanger wasn't allowed due to stack connector setting
559	Delta T delay was not configured for recycle response
560	Outlet T-rise enable was invalid
561	Heat exchanger T-rise enable was invalid
562	T-rise degrees was out of range
563	T-rise response was invalid
564	Outlet T-rise limit was exceeded
565	Heat exchanger T-rise limit was exceeded
566	Heat exchanger T-rise wasn't allowed due to stack limit setting
567	Heat exchanger T-rise wasn't allowed due to stack connector setting
568	Outlet T-rise wasn't allowed due to outlet connector setting
569	T-rise delay was not configured for recycle response
570	Heat exchanger high limit setpoint was out of range
571	Heat exchanger high limit response was invalid

Code	Description
572	Heat exchanger high limit was exceeded
573	Heat exchanger high limit wasn't allowed due to stack limit setting
574	Heat exchanger high limit wasn't allowed due to stack connector setting
575	Heat exchanger high limit delay was not configured for recycle response
576	CH pump output was invalid
577	DHW pump output was invalid
578	Boiler pump output was invalid
579	Auxiliary pump output was invalid
580	System pump output was invalid
581	Mix pump output was invalid
582-589	RESERVED
590	DHW plate preheat setpoint was invalid
591	DHW plate preheat ON hysteresis was invalid
592	DHW plate preheat OFF hysteresis was invalid
593	Tap detect degrees was out of range
594	Tap detect ON hysteresis was invalid
595	Inlet - DHW tap stop degrees was out of range
596	Outlet - Inlet tap stop degrees was out of range
597	DHW tap detect on threshold was invalid
598	DHW plate preheat detect on threshold was invalid
599	DHW plate preheat detect off threshold was invalid
600	Delta T inlet temperature was invalid
601	Delta T outlet temperature was invalid
602	Delta T exchanger temperature was invalid
603	CH ODR boost max offpoint temperature was invalid
604	CH ODR boost max offpoint temperature was too low
605	Lead Lag ODR boost max offpoint temperature was invalid

Table 5. Sola alert codes (continued)

Code	Description
606	Lead Lag ODR boost max offpoint temperature was too low
607	Mix ODR boost max offpoint temperature was invalid
608	Mix ODR boost max offpoint temperature was too low
609	Time to rotate lead boiler to next firing slave
610	Time to rotate lead boiler to next available slave
611	Time to rotate lead boiler to first firing slave in order
612	Time to rotate lead boiler to lowest running slave
613	Lead boiler was rotated based on new firing sequence order
614	Lead boiler was rotated based on measured run time
615	Parameter PCB was switched to backup
616	Range PCB was switched to backup

Table 6. Burner control states

State	Name
0	Initiate
1	Standby Delay
2	Standby
3	Safe Startup
4	Prepurge - Drive to Purge Rate
5	Prepurge - Measured Purge Rate
6	Prepurge - Drive to Light off Rate
7	Preignition Test
8	Preignition Time
9	Pilot Flame Establishing Period
10	Main Flame Establishing Period
11	Direct Burner Ignition
12	Run
13	Postpurge
14	Lockout
15	Prepurge (Fulton pulse)
16	Ignition (Fulton pulse)
17	Combustion Pressure Establish (Fulton pulse)
18	Combustion Pressure Stabilization (Fulton pulse)
19	Main Flame Stabilization (Fulton pulse)
255	Safety Processor Offline

Troubleshooting

If you have questions concerning the mounting, wiring or addressing of the UPC, please contact Weil-McLain Technical Support at 1-800-526-6636.

If changes are made to either the UPC, the boiler(s) interface, or the BAS and communication errors are observed, the power should be disconnected from the UPC for a minimum of 30 seconds and then restored. This will allow the UPC to reconfigure its settings and update any changes that were made.

Communication LED's

The LED's indicate if the translator is speaking to the devices on the network. The LED's should reflect communication traffic based on the baud rate set. The higher the baud rate the more solid the LED's become.

LED's	Status
Power	Lights when power is being supplied to the translator.
	NOTICE The UPC is protected by internal solid state polyswitches on the incoming power and network connections. These polyswitches are not replaceable and will reset themselves if the condi tion that caused the fault returns to normal.
Rx	Lights when the translator receives data from the network segment; there is an Rx LED for Ports 1 and 2.
Tx	Lights when the translator transmits data to the network segment; there is an Rx LED for Ports 1 and 2.
Run	Lights based on translator health. See table below.
Error	Lights based on translator health. See table below.

The **Run** and **Error** LED's indicate translator and network status.

If Run LED shows...	And Error LED shows...	Status is...
1 flash per second	1 flash per second, alternating with the **Run** LED	The translator files are archiving. Archive is complete when **Error** LED stops flashing.
2 flashes per second	Off	Normal
2 flashes per second	2 flashes, alternating with **Run** LED	Five minute auto-restart delay after system error
2 flashes per second	3 flashes, then off	The translator has just been formatted
2 flashes per second	On	Two or more devices on this network have the same MS/TP network address
2 flashes per second	1 flash per second	The translator is alone on the network
2 flashes per second	On	Exec halted after frequent system errors, due to: • Controller halted • Program memory corrupted • Address conflicts - duplicate MS/TP MAC addresses • One or more programs stopped
5 flashes per second	On	Exec start-up aborted, Boot is running

Troubleshooting (continued)

Communication LED's (continued)

5 flashes per second	Off	Firmware transfer in progress, Boot is running
7 flashes per second	7 flashes per second, alternating with Run LED	Ten second recovery period after brownout
14 flashes per second	14 flashes per second, alternating with Run LED	Brownout
On	On	Failure. Try the following solutions: • Turn the UPC off, then on. • Download memory to the UPC. • Replace the UPC.

Serial Number

If you need the UPC's serial number when troubleshooting, the number is on a sticker on the back of the main translator board.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

⚠CAUTION Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

CE Compliance

⚠WARNING This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

BACnet Compliance

BACnet® is a registered trademark of ASHRAE. ASHRAE does not endorse, approve or test products for compliance with ASHRAE standards. Compliance of listed products to requirements of ASHRAE Standard 135 is the responsibility of the BACnet manufacturers Association (BMA). BTL® is a registered trademark of the BMA.

Troubleshooting (continued)

Most common communication problems

Wiring termination

- If wiring an EIA-485 connection, the wire is terminated plus (+) to plus (+) and minus (-) to minus (-). If the receive LED is solid, this means you have the connection incorrectly terminated.
- If the wiring is an EIA-232 connection, the wire must connect plus (+) to minus (-) and minus (-) to plus (+). The GND must be connected to GND.

Jumper selection

- Make sure the jumper for the communication port is set to the communication networks wiring type EIA-485 or EIA-232.

Dipswitch selection

- Make sure the correct protocol is chosen - Comm Selector DIP switches **5, 6, 7, and 8**
- Make sure the correct baud rate is chosen - Comm Selector DIP switches **1 and 2**
- NOTE: These settings are defined at translator start-up. Power must be cycled to make a settings change.

Addressing -

- The rotary address switches define the translator's individuality on the network. Each device must have a unique address.

BACnet over ARC156

Verify BAS and controller settings:

1. Communication Selection jumper is set to BACnet over ARC156
2. BAS configured to speak 2-wire EIA-485 to the translator.
3. Rotary address switches set for the controller's unique slave address.
4. Proper connection wiring.
5. BAS reading or writing to the proper BACnet objects in the translator - download the latest points list for the translator to verify.
6. BAS is sending requests to the proper ARC156 MAC address of the controller.
7. Confirm the correct BACnet network number through the BACview.
8. Present the BAS company with a copy of your translator's BACnet PICS so that they know which BACnet commands are supported.

NOTE See Appendix (B) for Modbus Protocol Conformance Statement

Troubleshooting (continued)

BACnet MSTP

1. Both set to speak BACnet MS/TP.
   - Comm Selector DIP switches **5, 6, 7, and 8**
2. Both set for the same baud rate.
   - Comm Selector DIP switches **1 and 2**
3. BAS configured to speak 2-wire EIA-485 to the translator.
4. Both set to 8 data bits, No Parity, and 1 stop bit.
5. Rotary address switches set for the translator's unique slave address.
6. Proper connection wiring.
7. BAS reading or writing to the proper BACnet objects in the translator - download the latest points list for the translator to verify.
8. BAS is sending requests to the proper MS/TP MAC address of the translator.
9. Present the BAS company with a copy of your translator's BACnet PICS so that they know which BACnet commands are supported.

NOTES:

1. See Appendix (A) for the BACnet Protocol Conformance Statement.
2. MS/TP networks can be comprised of both Master and Slave nodes. Valid MAC addresses for Master nodes are 0 – 127 and valid addresses for Slave nodes are 0 - 254.
3. If the third party attempts to communicate to the translator but does not get a response, make sure the translator is set as a BACnet MS/TP (m) master. The BACnet software asks the translators, "Who Is?" This is to auto-locate devices on the network. Only translators set as masters will answer this request.

Modbus

Verify BAS and translator settings:

1. Verify that the BAS and controller are both set to speak the RTU protocol:
   - Comm Selector DIP switches **5, 6, 7, and 8**
2. Both set for the same baud rate.
   - Comm Selector DIP switches **1 and 2**
3. BAS configured to speak 2-wire EIA-485 to the translator.
4. Both set to 8 data bits, No Parity, and 1 stop bit.
5. Rotary address switches set for the translator's unique slave address.
6. Proper connection wiring.
7. BAS must be reading or writing to the proper Modbus register numbers on the translator. Download the latest points list for the translator to verify.
8. BAS is sending requests to the proper slave address of the translator.

NOTE: See Appendix (B) for Modbus Protocol Conformance Statement

Modbus Exception Codes that might be returned from this translator

Codes	Name	Description
01	Illegal Function	The Modbus function code used in the query is not supported by the translator.
02	Illegal Data Address	The register address used in the query is not supported by the translator.
04	Slave Device Failure	The Modbus Master has attempted to write to a non-existent register or a read-only register in the translator.

Appendix (A) BACnet Protocol Implementation Conformance Statement

Date: **7/15/05**

Vendor Name: **OEM**

Product Names: **UPC**

Product Model Number: **Unitary Protocol Converter**

Applications Software Version: **HW_Exec_B** Firmware Revision: **2.0**

BACnet Protocol Revision: **3**

Product Description:

The UPC is a gateway designed to allow a single piece of equipment (e.g. chiller, variable speed drive, etc.) to be integrated into an existing Building Management System. The UPC communicates to the equipment through its designated Device Port and exposes data to the BAS through its Network Port. The communications protocol used by the Network Port is DIP switch-selectable. BACnet options include BACnet over ARC156, BACnet MS/TP, and BACnet PTP with dial up modem support. Other non-BACnet protocols are also available, depending on the specific firmware downloaded to the UPC module. The communications protocol used by the Device Port is configured at the factory through software and is dictated by the specified equipment. BACnet objects are spawned within the device as a result of downloading graphical control programs.

BACnet Standardize Device Profile (Annex L): B-AAC

List of all BACnet Interoperability Building Blocks Supported (Annex K):

DS-RP-A*	AE-N-I-B	SCHED-I-B	T-VMT-I-B	DM-DDB-A*
DS-RP-B	AE-ACK-B	SCHED-E-B	T-ATR-B	DM-DDB-B
DS-RPM-A*	AE-ASUM-B			DM-DOB-A*
DS-RPM-B	AE-INFO-B			DM-DOB-B
DS-WP-A*	AE-ESUM-B			DM-DCC-B
DS-WP-B				DM-PT-A*
DS-WPM-A*				DM-PT-B
DS-WPM-B				DM-TS-B
DS–COV-A*				DM-UTC-B
DS–COV-B				DM-RD-B
DS–COVU-A*				DM-LM-B
DS–COVU-B				DM-BR-B
				NM-CE-A*

* Dynamic Binding is not supported when MS/TP is configured in slave mode.

Appendix (A) (continued)

Segmentation Capability:

Able to transmit segmented messages: (NO) Window Size:

Able to receive segmented messages: (NO) Window Size:

Standard Object Types Supported:

Each standard Object Type supported (i.e., an object of this type may be present in the product) is listed on a separate page.

For each standard Object Type supported provide the following data:

Whether objects of this type are dynamically creatable using BACnet's CreateObject service

Whether objects of this type are dynamically deletable using BACnet's CreateObject service

List of all optional properties supported

List of all properties that are writable where not otherwise required by this standard

List of proprietary properties and for each its property identifier, datatype, and meaning

List of any property range restrictions

Analog Value (PAR)

Analog Value (PAR):

1. Creatable?	**NO**		
2. Deletable?	**NO**		
3. Optional Properties Supported:	**acked_transitions** **cov_increment** **deadband** **description** **event_enable** **event_time_stamps**	**high_limit** **limit_enable** **low_limit** **notification_class** **notify_type**	**priority_array** **reliability** **relinquish_default** **time_delay**
4. Writeable Properties:	**cov_increment** **deadband** **description** **event_enable** **high_limit**	**limit_enable** **low_limit** **notification_class** **notify_type** **out_of_service**	**present_value** **relinquish_default** **time_delay** **units**
5. Proprietary properties: None			
6. Range Restrictions:			
	description	**limited to 50 octets in length**	
	present_value	**limited by min_pres_value and max_pres_value properties**	
	relinquish_default	**limited by min_pres_value and max_pres_value properties**	
	notification_class	**must be valid notification_class**	
	time_delay	**0 to 4294967295**	

Appendix (A) (continued)

Binary Value (PAR), (CLOCK), and (STAT)

Binary Value (PAR) and Binary Value (CLOCK) and Binary Value (STAT):

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	acked_transitions	event_enable	priority_array
	active_text	event_time_stamps	reliability
	alarm_value	inactive_text	relinquish_default
	change_of_state_count	minimum_off_time	time_delay
	change_of_state_time	minimum_on_time	time_of_active_time_reset
	description	notification_class	time_of_state_count_reset
	elapsed_active_time	notify_type	
4. Writeable Properties:	active_text	event_enable	notify_type
	alarm_value	inactive_text	out_of_service
	change_of_state_count	minimum_off_time	present_value
	description	minimum_on_time	relinquish_default
	elapsed_active_time	notification_class	time_delay
5. Proprietary properties: None			
6. Range Restrictions:			
	active_text	limited to 50 octets in length	
	change_of_state_count	0 to 4294967295	
	description	limited to 50 octets in length	
	elapsed_active_time	0 to 4294967295	
	inactive_text	limited to 50 octets in length	
	minimum_off_time	0 to 4294967295	
	minimum_on_time	0 to 4294967295	
	notification_class	must be valid notification_class	
	time_delay	0 to 4294967295	

Analog Value (STAT)

Analog Value (STAT):

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	acked_transitions	event_time_stamps	notification_class
	cov_increment	high_limit	notify_type
	deadband	limit_enable	reliability
	description	low_limit	time_delay
	event_enable		

Appendix (A) (continued)

Analog Value (STAT)

Analog Value (STAT):

4. Writeable Properties:	cov_increment	high_limit	notify_type
	deadband	limit_enable	out_of _service
	description	low_limit	time_delay
	event_enable	notification_class	units
5. Proprietary properties: None			
6. Range Restrictions:			
	description	limited to 50 octets in length	
	notification_class	must be valid notification_class	
	time_delay	0 to 4294967295	

Binary Value (PAR), (CLOCK), and (STAT)

Binary Value (STAT):

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	acked_transitions	elapsed_active_time	notify_type
	active_text	event_enable	reliability
	alarm_value	inactive_text	time_delay
	change_of_state_count	minimum_off_time	time_of_active_time_reset
	change_of_state_time	minimum_on_time	time_of_state_count_reset
	description	notification_class	
4. Writeable Properties:	active_text	event_enable	notification_class
	alarm_value	inactive_text	notify_type
	change_of_state_count	minimum_off_time	out_of_service
	description	minimum_on_time	time_delay
	elapsed_active_time		
5. Proprietary properties: None			
6. Range Restrictions:			
	active_text	limited to 50 octets in length	
	change_of_state_count	0 to 4294967295	
	description	limited to 50 octets in length	
	elapsed_active_time	0 to 4294967295	
	inactive_text	limited to 50 octets in length	
	minimum_off_time	0 to 4294967295	
	minimum_on_time	0 to 4294967295	
	notification_class	must be valid notification_class	
	time_delay	0 to 4294967295	

Appendix (A) (continued)

Binary Value (MODULE ALARM)

Binary Value (MODULE ALARM):

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	acked_transitions alarm_value description	event_enable event_time_stamps notification_class	notify_type time_delay
4. Writeable Properties:	alarm_value event_enable notification_class		notify_type out_of_service time_delay
5. Proprietary properties: None			
6. Range Restrictions:	notification_class time_delay	must be valid notification_class 0 to 4294967295	

Calendar

Calendar:

1. Creatable?	NO	
2. Deletable?	NO	
3. Optional Properties Supported:	description	
4. Writeable Properties:	date_list description	
5. Proprietary properties: None		
6. Range Restrictions:	date_list description	limited to 30 BACnetCalendarEntrys limited to 50 octets in length

Device

Device:

1. Creatable?	NO	
2. Deletable?	NO	

Appendix (A) (continued)

Device

Device:

3. Optional Properties Supported:	active_cov_subscriptions	description	max_info_frames
	active_vt_sessions	last_restore_time	max_master
	apdu_segment_timeout	list_of_session_keys	time_synchronization_recipients
	configuration_files	local_date	utc_offset
	database_revision	local_time	vt_classes_supported
	daylight_savings_status	location	
4. Writeable Properties:	apdu_segment_timeout	local_time	object_identifier
	apdu_timeout	location	object_name
	backup_failure_timeout	max_info_frames	time_synchronization_recipients
	description	max_master	utc_offset
	local_date	number_of_apdu_retries	
5. Proprietary properties: None			
6. Range Restrictions:			
	description	limited to 50 octets in length	
	location	limited to 50 octets in length	
	max_master	1 to 127	
	object_identifier	must be valid device identifier	
	object_name	limited to 50 octets in length	
	utc_offset	_780 to 780	

File

File:

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	description		
4. Writeable Properties:	archive	file_type	read_only
	description	modification_date	
5. Proprietary properties: None			
6. Range Restrictions:			
	description	limited to 50 octets in length	
	file_type	limited to 50 octets in length	

Appendix (A) (continued)

Multi_State Value

Multi_State Value (PAR):

Multi_State Value (CLOCK):

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	acked_transitions	fault_values	reliability
	alarm_values	notification_class	relinquish_default
	description	notify_type	state_text
	event_enable	priority_array	time_delay
	event_time_stamps		
4. Writeable Properties:	alarm_values	notification_class	present_value
	description	notify_type	relinquish_default
	event_enable	out_of_service	time_delay
	fault_values		
5. Proprietary properties: None			
6. Range Restrictions:			
	description	limited to 50 octets in length	
	notification_class	must be valid notification_class	
	present_value	must be valid state	
	relinquish_default	must be valid state	
	time_delay	0 to 4294967295	

Multi_State Value (STAT):

Multi_State Value (STAT):

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	acked_transitions	event_time_stamps	reliability
	alarm_values	fault_values	state_text
	description	notification_class	time_delay
	event_enable	notify_type	
4. Writeable Properties:	alarm_value	fault_values	out_of_service
	description	notification_class	time_delay
	event_enable	notify_type	
5. Proprietary properties:	None		
6. Range Restrictions:	description	limited to 50 octets in length	
	notification_class	must be valid notification_class	
	present_value	must be valid state	
	time_delay	0 to 4294967295	

Appendix (A) (continued)

Notification Class

Notification Class:

1. Creatable?	NO	
2. Deletable?	NO	
3. Optional Properties Supported:	descriptions	
4. Writeable Properties:	ack_required	priority
	description	recipient_list
5. Proprietary properties: None		
6. Range Restrictions:		
	description	limited to 50 octets in length
	recipient_list	limited to 5 BACnetDestinations

Program

Program:

1. Creatable?	NO	
2. Deletable?	NO	
3. Optional Properties Supported:	description	program_location
	description_of_halt	reason_for_halt
	instance_of	reliability
4. Writeable Properties:	description	
	program_change	
	program_location	
5. Proprietary properties: None		
6. Range Restrictions:	description	limited to 50 octets in length
	program_location	limited to 50 octets in length

Appendix (A) (continued)

Schedule

Schedule (ENUM) and Schedule (UNS):

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	priority_for_writing description	exception_schedule weekly_schedule	
4. Writeable Properties:	description event_enable exception_schedule	list_of_object_property_references present_values	priority_for_writing weekly_schedule
5. Proprietary properties:	None		
6. Range Restrictions:	description	limited to 50 octets in length limited to 30 BACnetSpecialEvents	
	exception_schedule	each being limited to 6 BACnetTimeValues	
	present_value	0 to 4294967295	
	weekly_schedule	limited to 6 BACnetTimeValues per BACnetDailySchedule	

Trend_log (Non-BACnet Property)

Trend_log (of a Non-BACnet property):

1. Creatable?	NO		
2. Deletable?	NO		
3. Optional Properties Supported:	acked_transitions client_cov_increment cov_resubscription_interval description event_enable	event_time_stamps last_notify_record log_interval notification_class notification_threshold	notify_type records_since_notification start_time stop_time
4. Writeable Properties:	buffer_size client_cov_increment cov_resubscription_interval description event_enable	log_enable log_interval notification_class notification_threshold notify_type	record_count start_time stop_time stop_when_ full
5. Proprietary properties:	None		
6. Range Restrictions:	description log_interval notification_class notification_threshold record_count	limited to 50 octets in length 0 to 4294967295 must be valid notification_class 0 to 4294967295 can only be written to 0	

Appendix (A) (continued)

BACnet Data Link Layer Options

Data Link Layer Options:

- BACnet IP, (Annex J)
- Able to register as a Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8) baud rate(s) 156k baud
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 76800
- MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400, 76800
- Point-To-Point, EIA 232 (Clause 10), baud rate(s): 9600, 19200, 38400, 76800
- Point-To-Point, modem, (Clause 10), baud rate(s): 9600, 19200, 38400, 76800
- LonTalk, (Clause 11), medium: _____
- Other:

Device Address Binding Methods Supported:

- Send Who-Is, receive I-Am (BIBB DM-DDB-A)*
- Receive Who-Is, send I-Am (BIBB DM-DDB-B)
- Send Who-Has, receive I-Have (BIBB DM-DOB-A)*
- Receive Who-Has, send I-Have (BIBB DM-DOB-B)
- Manual configuration of recipient device's network number and MAC address.
- None of the above

* Dynamic Binding is not supported when MS/TP is configured as a slave node.

*** Networking Options:**

- Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
- Annex H.3, BACnet Tunneling Router over UDP/IP
- BACnet/IP Broadcast Messaging Device (BBMD)

Does the BBMD support registrations by Foreign Devices? ☐ Yes ☐ No

Character Sets Supported:

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- ANSI X3.4
- IBM™/Microsoft™☐ DBCS
- ISO 8859-1
- ISO 10646 (UCS-2)
- ISO 10646 (ICS-4)
- JIS C 6226

If this product is a communication gateway, describe the non-BACnet equipment/networks(s) that the gateway supports:

The UPC supports the N2, Modbus (RTU & ASCII), and LonTalk communication protocols. The UPC is a slave device when N2 or Modbus is selected for BAS communications through the Network Port. Conversely, the UPC must become the master when controlling a single piece of Modbus or N2 equipment through the Device Port. LonTalk communications requires the UPC's EIA-232 port as well as Echelon's Serial-to-LonTalk Adapter.

Appendix (B) Modbus Protocol Implementation Conformance Statement

Date: 11/22/05

Vendor Name: OEM

Product Name: UPC

Applications Software Version: HW_Exec_B Firmware Revision: 2.03

Product Description:

The UPC is a general purpose building management translator with custom programmable functionality, designed for communicating through multiple protocols. Modbus registers are spawned within the device as a result of downloading graphical control programs. The UPC translator speaks the Modicon Modbus RTU/ASCII Protocol as described in the Modicon Modbus Protocol Reference Guide, PI-MBUS-300 Rev.J, and acts as a Modbus Master or Slave. Further details on the Modbus supported implementation are described below. Device Address Binding Methods Supported:

Serial Transmission Mode:	Supported?
RTU	Master or Slave (Slave RTU is the Default Dipswitch setting)
ASCII	Master or Slave

Communication Types:	Baud rates:	Data Bits:	Parity:	Stop Bits:
2-wire EIA-485, 4-wire EIA-485, or EIA-232	9600, 19200, 38400, 76800	8	None	1

Function Codes:	Purpose:	Used with Register Numbers:
01 – Read Coil Status	Read Discrete Outputs	00001 - 09999
02 – Read Input Status	Read Discrete Inputs	10001 - 19999
03 – Read Holding Registers	Read Holding Registers	40001 - 49999
04 – Read Input Registers	Read Input Registers	30001 - 39999
05 – Force Single Coil	Write Discrete Outputs (single)	00001 - 09999
06 – Preset Single Register	Write Holding Registers (single)	40001 - 49999
15 – Force Multiple Coils	Write Discrete Outputs	00001 - 09999
16 – Preset Multiple Coils	Write Holding Registers	40001 - 49999

Appendix (B) (continued)

Register Type:	Range:	Function Codes Used with this Register Type:
Float Value (FLOAT)	Single-Precision IEEE floating point value	3 – Read Holding Register 6 – Preset Single Register 16 – Preset Multiple Register
Unsigned Integer (UINT)	0 - 65535	3 – Read Holding Register 6 – Preset Single Register 16 – Preset Multiple Register
Signed Integer (SINT)	-32768 - 32767	3 – Read Holding Register 6 – Preset Single Register 16 – Preset Multiple Register
Discrete Input (DI)	0 = Off, 1 = On	2 – Read Input Status
Discrete Input (DI)	0 = Off, 1 = On	1 – Read Coil Status 5 – Force Single Coil 15 – Force Multiple Coils

Replacement Parts

Item	Description	Part Number
1	BACnet Translator Kit	383-600-304
2	Modbus to BACnet Translator Control Module - UPC	511-330-283
3	UPC Instructions & Reference Guide	550-100-130
4	24 VAC Power Wire Harness	591-391-765
5	2-Pole 24 VAC Power Connector (5.0mm)	512-050-245
6	3-Pole BAS Connector (5.0mm)	512-050-246
7	5-Pole Boiler Unit/System Connector (5.0mm)	512-050-247

SlimFit™ Building Automation System Interface Instructions & Reference Guide - UPC BACnet Translator

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