

Protocol Interface Mapping

Firmware Version 5.05

Main	Setup	Status	Events	Network	System		
Status - [14:59 02-Dec-09]							
Ckt#	ID	Mode	°F	SetP	Amps	G.F.	Status
1-1	Bathrooms	HWAT	112	115	0.0	0	On
1-2	Kitchen/Laundry	HWAT	141	140	0.2	0	On
1-3	Ice rink	FFHV	42	45	0.0	0	On
1-4	Lobby	FLHT	74	83	0.0	0	On
1-5	Unassigned	N/A	---	---	---	---	---

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☐ Hide Unassigned Circuits
 Alarm Relays 1 2 3

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Section 1. Introduction

This manual details all the Modbus registers of the ACS-UIT. It is intended to be used by the users' system integrators who want to interface with their external device (i.e. DCS or BMS system) to the ACS-UIT using the Modbus protocol. The manual includes details of the system's current configuration, availability resources, set-up parameters, current conditions, alarm status and numerous other fixed and variable data points.

The Raychem ACS-30 Advanced Commercial Control system has the capability to monitor and control up to 99 devices (260 circuits) consisting of ACS-PCM-5 power control panels and RMM2 remote temperature monitoring modules using an RS-485 network. This manual should be used in conjunction with the *ACS-30 Programming Guide (H58279)* and the heating cable application design guide appropriate for the application.

1.1 How to Use This Manual

The Raychem ACS-CRM Modbus register can be accessed by DCS or BMS systems. However, this should only be done by expert users who understand that the system makes use of extensive semaphore fields to assure synchronization between the possibility of multiple users and conflicting instructions. Pentair Thermal Building Solutions has tested the system performance and synchronization when changes are made using the UIT touch screen. System Integrators should not attempt to make set-up changes via the UIT Modbus Interface unless they are prepared to re-validate system performance with their own resources.

Most Modbus applications will be satisfied by READ ONLY access to the data base highlight in Section 2.15 Circuit Resources and 2.10 Circuit Control Data. These portions of the Modbus register map provide access to the current set-up and real time values being measured by the system. A snap shot of the current conditions, data for trending, alarm status, the current setting for the alarm thresholds and setpoints can be easily read without any risk to the system performance.

The entire Modbus register map is included in this document for completeness. Writing to the database is within the capability of most Modbus host devices. However, we strongly recommend that system integrators who write to the database must thoroughly test their system to ensure it is working properly and that there are no unintended consequences.

1.2 Modbus Communications

The Raychem ACS-UIT external communications serial port can be configured for use as an RS-232, RS-485 or Ethernet. The host defaults are:

- **Port Mode: RS-485**
- **Modbus Address: 1**
- **Baud Rate: 9600**
- **Transmit Delay: 0**
- **Receive Timeout: 50 milliseconds**

The Raychem ACS-UIT mode of transmission is Remote Terminal Unit (RTU). The standard configuration is eight data bits, no parity and two stop bits. To change the defaults listed above, refer to the Raychem ACS-CRM Programming Guide (H58186).

Section 2. Modbus Register Map

2.1 ACS-UIT Information Coils

Modbus Function Code: 1,5,15

Modbus Start Address: 1

Modbus Block Size: 5

Number of Blocks: 1

Modbus Address	Function Code	Description	Comments
1	1,5,15	Offline Config	Write 1 = Do not validate device addresses, set to a zero on any future coil read
2	1,5,15	Network sensor device scan	Write 1 = Perform network sensor scan, write 0 = no action Read 1 = scan is in progress, read 0 scan complete
3	1,5,15	Acknowledge Alarm	Write 1 = Acknowledge event/alarm, write 0 = no action
4	1,5,15	Spare	
5	1,5,15	Modbus Units	Write 1=Degrees C, 0=Degrees F, default Degrees F

2.2 ACS-UIT Device Status Change List

Modbus Function Code: 1,5,15

Modbus Start Address: 101

Modbus Block Size: 99

Number of Blocks: 1

Modbus Address	Function Code	Description	Comments: write a 1 to clear flag
101	1,5,15	Device 1 Status Change Flag	
102	1,5,15	Device 2 Status Change Flag	
103	1,5,15	Device 3 Status Change Flag	
104	1,5,15	Device 4 Status Change Flag	
105	1,5,15	Device 5 Status Change Flag	
....	1,5,15	Device ... Status Change Flag	
196	1,5,15	Device 96 Status Change Flag	
197	1,5,15	Device 97 Status Change Flag	
198	1,5,15	Device 98 Status Change Flag	
199	1,5,15	Device 99 Status Change Flag	

2.3 ACS-UIT Input Status

Modbus Function Code: 2

Modbus Start Address: 1

Modbus Block Size: 10

Number of Blocks: 1

Modbus Address	Function Code	Description	Comments
1	2	ACS-UIT Alarm Relay #1 status	1 = Off, 0 = On
2	2	ACS-UIT Alarm Relay #2 status	1 = Off, 0 = On
3	2	ACS-UIT Alarm Relay #3 status	1 = Off, 0 = On
4	2	spare	
5	2	spare	
6	2	spare	
7	2	spare	
8	2	spare	
9	2	spare	
10	2	spare	

2.4 ACS-UIT Input Registers

Modbus Function Code: 4

Modbus Start Address: 1

Modbus Block Size: 100

Number of Blocks: 1

Modbus Address	Function Code	Description	Comments
1	4	ACS-UIT Device Type	0x300
2	4	ACS-UIT Firmware Version Major	0-255
3	4	ACS-UIT Firmware Version Minor	0-255
4	4	Build Number	0-999
5	4	spare	
6	4	spare	
7	4	spare	
8	4	spare	
9	4	spare	
...	4	spare	
100	4	spare	

2.5 ACS-UIT System Status Flags

Modbus Function Code: 4

Modbus Start Address: 7001

Modbus Block Size: 4

Number of Blocks: 1

Modbus Address	Function Code	Description	This is the total system status for all circuits. All circuit status is "OR"ed to get this status.
20001	4	Circuit 1 Status1	Spare = 0x0001; spare = 0x0002; spare = 0x0004; spare = 0x0008; GROUND_FAULT_ALARM = 0x0010; GROUND_FAULT_TRIP_ALARM = 0x0020; HIGH_LIMIT_CUTOUT = 0x0040; FAIL_SAFE_ALARM = 0x0080; spare = 0x0100; spare = 0x0200; RELAY_FAILURE_ALARM = 0x0400; spare = 0x0800; spare = 0x1000; spare = 0x2000; DEAD_BATTERY = 0x4000; RELAY_STATE = 0x8000;
20002	4	Circuit 1 Status 2	RTD_A_FAILURE_ALARM = 0x0001; RTD_B_FAILURE_ALARM = 0x0002; RTD_C_FAILURE_ALARM = 0x0004; RTD_D_FAILURE_ALARM = 0x0008; RTD_A_LOW_TEMP_ALARM = 0x0010; RTD_B_LOW_TEMP_ALARM = 0x0020; RTD_C_LOW_TEMP_ALARM = 0x0040; RTD_D_LOW_TEMP_ALARM = 0x0080; RTD_A_HIGH_TEMP_ALARM = 0x0100; RTD_B_HIGH_TEMP_ALARM = 0x0200; RTD_C_HIGH_TEMP_ALARM = 0x0400; RTD_D_HIGH_TEMP_ALARM = 0x0800; spare = 0x1000; spare = 0x2000;

Modbus Address	Function Code	Description	This is the total system status for all circuits. All circuit status is "OR"ed to get this status.
			COMM FAILURE = 0x4000; //on any device on Circuit Spare = 0x8000;
20003	4	Circuit Status 3	Reserved
20004	4	Circuit Status 4	Reserved
20005	4	Control Temperature	.1 degrees
20006	4	Circuit RTD-A Temperature	.1 degrees
20007	4	Circuit RTD-B Temperature	.1 degrees
20008	4	Circuit RTD-C Temperature	.1 degrees
20009	4	Circuit RTD-D Temperature	.1 degrees
20010	4	Current	.01 A
20011	4	Ground Fault	.1 mA
20012	4	Computed Duty Cycle On Count	Seconds
20013	4	Computed Duty Cycle Off Count	Seconds
20014	4	Next Relay Switch	Seconds
20015	4	Total Heater Time MSW	Hours
20016	4	Total Heater Time LSW	

ACS-UIT Circuit Status cont.

Modbus Address	Function Code	Description	Comments: (1 entry for all 99 * 5 relay outputs) Circuit Number = (addr-1)*5)+(relay#) Circuit Modbus Offset = (Circuit Number-1 * 70) + 20001
20017	4	Relay Cycle Count MSW	Cycles
20018	4	Relay Cycle Count LSW	
20019	4	spare	
20020	4	Line Temp	.1 degrees
20021	4	Min Line Temp	.1 degrees
20022	4	Max Line Temp	.1 degrees
20023	4	Max Current	.01 A
20024	4	Max Ground Fault	.1 mA
20025	4	Low Control Temp Alarm Value	.1 degrees, latched alarm value associated with Circuit Status above
20026	4	High Control Temp Alarm Value	.1 degrees, latched alarm value associated with Circuit Status above
20027	4	Ground Fault Alarm Value	.1 mA, latched alarm value associated with Circuit Status above
20028	4	Ground Fault Trip Alarm Value	.1 mA, latched alarm value associated with Circuit Status above
20029	4	Energy MSW	.01 kWh
20030	4	Energy LSW	
20031	4	spare	
20032	4	spare	
20033	4	spare	
20034	4	spare	
20035	4	spare	
20036	4	spare	
20037	4	spare	
20038	4	spare	
20039	4	spare	
20040	4	spare	

Modbus Address	Function Code	Description	Comments: (1 entry for all 99 * 5 relay outputs) Circuit Number = (addr-1)*5)+(relay#) Circuit Modbus Offset = (Circuit Number-1 * 70) + 20001
20041	4	spare	
20042	4	spare	
20043	4	spare	
20044	4	spare	
20045	4	spare	
20046	4	spare	
20047	4	spare	
20048	4	spare	
20049	4	spare	
20050	4	spare	
20051	4	spare	
20052	4	spare	
20053	4	spare	
20054	4	spare	

ACS-UIT Circuit Status cont.

Modbus Address	Function Code	Description	Comments: (1 entry for all 99 * 5 relay outputs) Circuit Number = (addr-1)*5)+(relay#) Circuit Modbus Offset = (Circuit Number-1 * 70) + 20001
20055	4	spare	
20056	4	spare	
20057	4	spare	
20058	4	spare	
20059	4	spare	
20060	4	spare	
20061	4	spare	
20062	4	spare	
20063	4	spare	
20064	4	spare	
20065	4	spare	
20066	4	spare	
20067	4	spare	
20068	4	spare	
20069	4	spare	
20070	4	spare- End of Mapped Circuit Status	

2.7 ACS-UIT Holding Registers

Modbus Function Code: 3,6,16

Modbus Start Address: 1

Modbus Block Size: 100

Number of Blocks: 1

Modbus Address	Function Code	Description	Comments
1	3,6,16	ACS-UIT Tag 0	ACS-UIT Tag
2	3,6,16	ACS-UIT Tag 1	ACS-UIT Tag
3	3,6,16	ACS-UIT Tag 2	ACS-UIT Tag
4	3,6,16	ACS-UIT Tag 3	ACS-UIT Tag
5	3,6,16	ACS-UIT Tag 4	ACS-UIT Tag
6	3,6,16	ACS-UIT Tag 5	ACS-UIT Tag

Modbus Address	Function Code	Description	Comments
7	3,6,16	ACS-UIT Tag 6	ACS-UIT Tag
8	3,6,16	ACS-UIT Tag 7	ACS-UIT Tag
9	3,6,16	ACS-UIT Tag 8	ACS-UIT Tag
10	3,6,16	ACS-UIT Tag 9	ACS-UIT Tag
11	3,6,16	ACS-UIT Tag 10	ACS-UIT Tag
12	3,6,16	ACS-UIT Tag 11	ACS-UIT Tag
13	3,6,16	ACS-UIT Tag 12	ACS-UIT Tag
14	3,6,16	ACS-UIT Tag 13	ACS-UIT Tag
15	3,6,16	ACS-UIT Tag 14	ACS-UIT Tag
16	3,6,16	ACS-UIT Tag 15	ACS-UIT Tag
17	3,6,16	ACS-UIT Tag 16	ACS-UIT Tag

ACS-UIT Holding Registers cont.

Modbus Address	Function Code	Description	Comments
18	3,6,16	ACS-UIT Tag 17	ACS-UIT Tag
19	3,6,16	ACS-UIT Tag 18	ACS-UIT Tag
20	3,6,16	ACS-UIT Tag 19	ACS-UIT Tag
21	3,6,16	ACS-UIT Tag 20	ACS-UIT Tag
22	3,6,16	ACS-UIT Tag 21	ACS-UIT Tag
23	3,6,16	ACS-UIT Tag 22	ACS-UIT Tag
24	3,6,16	ACS-UIT Tag 23	ACS-UIT Tag
25	3,6,16	ACS-UIT Tag 24	ACS-UIT Tag
26	3,6,16	ACS-UIT Tag 25	ACS-UIT Tag
27	3,6,16	ACS-UIT Tag 26	ACS-UIT Tag
28	3,6,16	ACS-UIT Tag 27	ACS-UIT Tag
29	3,6,16	ACS-UIT Tag 28	ACS-UIT Tag
30	3,6,16	ACS-UIT Tag 29	ACS-UIT Tag
31	3,6,16	ACS-UIT Tag 30	ACS-UIT Tag
32	3,6,16	ACS-UIT Tag 31	ACS-UIT Tag
33	3,6,16	ACS-UIT Tag 32	ACS-UIT Tag
34	3,6,16	ACS-UIT Tag 33	ACS-UIT Tag
35	3,6,16	ACS-UIT Tag 34	ACS-UIT Tag
36	3,6,16	ACS-UIT Tag 35	ACS-UIT Tag
37	3,6,16	ACS-UIT Tag 36	ACS-UIT Tag
38	3,6,16	ACS-UIT Tag 37	ACS-UIT Tag
39	3,6,16	ACS-UIT Tag 38	ACS-UIT Tag
40	3,6,16	ACS-UIT Tag 39	ACS-UIT Tag (writing this char triggers an internal write to database for the complete string)
41	3,6,16	Date YYYY	Date - YYYY
42	3,6,16	Date MM	Date - MM = 1 - 12
43	3,6,16	Date DD	Date - DD = 1 - 31
44	3,6,16	Time HH	Time - HH = 0 - 23
45	3,6,16	Time MM	Time - MM = 0 - 59
46	3,6,16	spare	
47	3,6,16	spare	
48	3,6,16	spare	
49	3,6,16	spare	

Modbus Address	Function Code	Description	Comments
50	3,6,16	ACS-UIT Relay 1 Alarm Mask	bit 0=Audible Alarm (this bit can only be set by itself), bit 1=Temp Alarm, bit 2=Ground Fault Alarm, bit 3=Relay Fail Alarm, bit 4=Comm Alarm, bit 5=RTD Fail Alarm
51	3,6,16	ACS-UIT Relay 2 Alarm Mask	bit 0=Audible Alarm (this bit can only be set by itself), bit 1=Temp Alarm, bit 2=Ground Fault Alarm, bit 3=Relay Fail Alarm, bit 4=Comm Alarm, bit 5=RTD Fail Alarm
52	3,6,16	ACS-UIT Relay 3 Alarm Mask	bit 0=Audible Alarm (this bit can only be set by itself), bit 1=Temp Alarm, bit 2=Ground Fault Alarm, bit 3=Relay Fail Alarm, bit 4=Comm Alarm, bit 5=RTD Fail Alarm
53	3,6,16	Roof Gutter/Snow Melting External Stagger Start	0-30 minutes
54	3,6,16	spare	
55	3,6,16	spare	
56	3,6,16	spare	
57	3,6,16	spare	
58	3,6,16	spare	
59	3,6,16	spare	
60	3,6,16	Enable Mapped Circuit Access	0=Linear Modbus Circuit Access, 1= Mapping Modbus Circuit Access. This is used with BACnet interface. When this register is set to 1 and Holding Register 1000 is set to a circuit number (1-500)
61	3,6,16	spare	
62	3,6,16	spare	
63	3,6,16	Delete Device Command	0x7002 - this value has to be written before Device number
64	3,6,16	Device Number to Delete	Device number 1 - 99 and associated circuits
65	3,6,16	spare	
...	3,6,16	spare	
100	3,6,16	spare	

2.8 ACS-UIT Database Synchronization / Global Alarm Status

Modbus Function Code: 3,6,16

Modbus Start Address: 101

Modbus Block Size: 1

Number of Blocks: 1

Modbus Address	Function Code	Description	Comments
101	3,6,16	Database Synchronization/Alarm Status Flags	0x0001 = General Information Change Flag 0x0002 = Circuit Database Change Flag 0x0004 = Circuit Alarm Status Change Flag 0x0008 = Circuit Alarm Reset Change Flag 0x0010 = Device List Change Flag (after a scan) 0x0020 = Device Alarm Change Flag (comm errors or embed this in device list) 0x0040 = spare 0x0080 = spare Write 1 to bit position to clear flag

2.9 ACS-UIT Circuit Mapping Register

Modbus Function Code: 3, 6, 16

Modbus Start Address: 1000

Modbus Block Size: 1

Number of Blocks: 1

Modbus Address	Function Code	Description	This is used with BACnet interface. When Holding Register 60 is set to 1 and this register is set to a circuit number (1-500).
1000	3,6,16	Mapped Circuit Number	1-500

2.10 ACS-UIT Circuit Control Data

Modbus Function Code: 3, 6, 16

Modbus Start Address: 1001

Modbus Block Size: 120

Number of Blocks: 500

Modbus Address	Function Code	Description	Set Mapped Circuit Register Holding Register 1000 prior to using these registers. 1 entry for all 99 address * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits) Contains both Read only and Read/Write data Circuit Number = (addr-1) * 5)+(relay#)
1001	3,6,16	ACS-UIT Circuit 1 Tag 0	ACS-UIT Tag (Unicode 39 chars + null)
1002	3,6,16	ACS-UIT Circuit 1 Tag 1	ACS-UIT Tag
1003	3,6,16	ACS-UIT Circuit 1 Tag 2	ACS-UIT Tag
1004	3,6,16	ACS-UIT Circuit 1 Tag 3	ACS-UIT Tag
1005	3,6,16	ACS-UIT Circuit 1 Tag 4	ACS-UIT Tag
1006	3,6,16	ACS-UIT Circuit 1 Tag 5	ACS-UIT Tag
1007	3,6,16	ACS-UIT Circuit 1 Tag 6	ACS-UIT Tag
1008	3,6,16	ACS-UIT Circuit 1 Tag 7	ACS-UIT Tag
1009	3,6,16	ACS-UIT Circuit 1 Tag 8	ACS-UIT Tag
1010	3,6,16	ACS-UIT Circuit 1 Tag 9	ACS-UIT Tag
1011	3,6,16	ACS-UIT Circuit 1 Tag 10	ACS-UIT Tag
1012	3,6,16	ACS-UIT Circuit 1 Tag 11	ACS-UIT Tag
1013	3,6,16	ACS-UIT Circuit 1 Tag 12	ACS-UIT Tag
1014	3,6,16	ACS-UIT Circuit 1 Tag 13	ACS-UIT Tag
1015	3,6,16	ACS-UIT Circuit 1 Tag 14	ACS-UIT Tag
1016	3,6,16	ACS-UIT Circuit 1 Tag 15	ACS-UIT Tag
1017	3,6,16	ACS-UIT Circuit 1 Tag 16	ACS-UIT Tag
1018	3,6,16	ACS-UIT Circuit 1 Tag 17	ACS-UIT Tag
1019	3,6,16	ACS-UIT Circuit 1 Tag 18	ACS-UIT Tag
1020	3,6,16	ACS-UIT Circuit 1 Tag 19	ACS-UIT Tag
1021	3,6,16	ACS-UIT Circuit 1 Tag 20	ACS-UIT Tag
1022	3,6,16	ACS-UIT Circuit 1 Tag 21	ACS-UIT Tag
1023	3,6,16	ACS-UIT Circuit 1 Tag 22	ACS-UIT Tag
1024	3,6,16	ACS-UIT Circuit 1 Tag 23	ACS-UIT Tag
1025	3,6,16	ACS-UIT Circuit 1 Tag 24	ACS-UIT Tag
1026	3,6,16	ACS-UIT Circuit 1 Tag 25	ACS-UIT Tag
1027	3,6,16	ACS-UIT Circuit 1 Tag 26	ACS-UIT Tag
1028	3,6,16	ACS-UIT Circuit 1 Tag 27	ACS-UIT Tag
1029	3,6,16	ACS-UIT Circuit 1 Tag 28	ACS-UIT Tag
1030	3,6,16	ACS-UIT Circuit 1 Tag 29	ACS-UIT Tag
1031	3,6,16	ACS-UIT Circuit 1 Tag 30	ACS-UIT Tag
1032	3,6,16	ACS-UIT Circuit 1 Tag 31	ACS-UIT Tag
1033	3,6,16	ACS-UIT Circuit 1 Tag 32	ACS-UIT Tag
1034	3,6,16	ACS-UIT Circuit 1 Tag 33	ACS-UIT Tag
1035	3,6,16	ACS-UIT Circuit 1 Tag 34	ACS-UIT Tag

ACS-UIT Circuit Control Data cont.

Modbus Address	Function Code	Description	Set Mapped Circuit Register Holding Register 1000 prior to using these registers. 1 entry for all 99 address * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits) Contains both Read only and Read/Write data Circuit Number = (addr-1) * 5)+(relay#)
1036	3,6,16	ACS-UIT Circuit 1 Tag 35	ACS-UIT Tag
1037	3,6,16	ACS-UIT Circuit 1 Tag 36	ACS-UIT Tag
1038	3,6,16	ACS-UIT Circuit 1 Tag 37	ACS-UIT Tag
1039	3,6,16	ACS-UIT Circuit 1 Tag 38	ACS-UIT Tag
1040	3,6,16	ACS-UIT Circuit 1 Tag 39	ACS-UIT Tag (writing this char triggers a internal write to database for the complete string)
1041	3,6,16	Relay Address/Number	Read Only - High Byte (1 thru 99), Low Byte (1-5 for ACS-30)
1042	3,6,16	Circuit Enable	This is a Read/Write type register. A user can only write a 0 to Disable, or a 1 to Enable a Circuit. However, you may read back a different value. If a Circuit is deleted, the register may read back as a 2 which indicated the Circuit has been deleted. Otherwise,
1043	3,6,16	Control Mode	0=Unassigned, 1=HWAT, 2=Frost HeaveOff, 3=Floor Heating, 4=Pipe Freeze, 5=Fuel Oil, 6=Greasy Waste, 7=Roof and Gutter, 8=Snow Melting
1044	3,6,16	Fail Safe State	0=Off, 1=On
1045	3,6,16	Ground Fault Alarm	.1 mA
1046	3,6,16	Ground Fault Trip	.1 mA
1047	3,6,16	HWAT Cable Type	0=HWAT-Y2, 1=HWAT-R2
1048	3,6,16	Voltage	0=208 V, 1=240 V, 2=277 V, 3=120 V
1049	3,6,16	HWAT Pipe Type	0=Metal, 1=Plastic
1050	3,6,16	HWAT Power Factor	40%-160%
1051	3,6,16	HWAT Ambient Temp	.1 degrees [See limits section above function 4 offset 201]
1052	3,6,16	HWAT/Floor Heating Program Mode	0=Constant, 1=Variable
1053	3,6,16	Temperature Alarm filter	0 - 999 minutes
1054	3,6,16	Temperature Control Mode - Pipe Freeze/Fuel Oil (modes only)	0=Ambient, 1=Line Control, 2=PASC
1055	3,6,16	Roof Gutter/Snow Melt Control Mode	0=External Device, 1=Ambient Temp, 2 = Surface Temp
1056	3,6,16	Roof Gutter/Snow Melt Manual Override	0 - 10 Hours
1057	3,6,16	Roof Gutter/Snow Melt Manual Override State	0=Off, 1=On
1058	3,6,16	Roof Gutter/Snow Melt PowerOff Delay	0 - 10 Hours
1059	3,6,16	PASC Min Ambient Temp	.1 degrees [See limits section above function 4 offset 201]
1060	3,6,16	PASC Min Pipe Size	0=.5 inch, 1= 1 inch, 2= >=2 inches
1061	3,6,16	Power Adjust	10-200%
1062	3,6,16	Floor Heating Ambient Override	55-100 degrees, default 55 degrees
1063	3,6,16	Maintain Temp	.1 degrees [See limits section above function 4 offset 201]
1064	3,6,16	Economy Temp	.1 degrees [See limits section above function 4 offset 201]
1065	3,6,16	Deadband	.1 degrees [See limits section above function 4 offset 110]
1066	3,6,16	Low Temp Alarm	.1 degrees [See limits section above function 4 offset 201]
1067	3,6,16	High Temp Alarm	.1 degrees [See limits section above function 4 offset 201]
1068	3,6,16	High Limit Temp Cutout	.1 degrees [See limits section above function 4 offset 201]
1069	3,6,16	High Limit Temp Cutout Enable	1=enable, 0=disable
1070	3,6,16	spare	
1071	3,6,16	spare	
1072	3,6,16	spare	

Modbus Address	Function Code	Description	Set Mapped Circuit Register Holding Register 1000 prior to using these registers. 1 entry for all 99 address * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits) Contains both Read only and Read/Write data Circuit Number = (addr-1) * 5)+(relay#)
1073	3,6,16	spare	
1074	3,6,16	spare	
1075	3,6,16	RTD-A Address/Number	High Byte (1 thru 99), Low Byte (1-5 for 5GF, 1-8 for RMM)
1076	3,6,16	RTD-B Address/Number	High Byte (1 thru 99), Low Byte (1-5 for 5GF, 1-8 for RMM)
1077	3,6,16	RTD-C Address/Number	High Byte (1 thru 99), Low Byte (1-5 for 5GF, 1-8 for RMM)
1078	3,6,16	RTD-D Address/Number	High Byte (1 thru 99), Low Byte (1-5 for 5GF, 1-8 for RMM)
1079	3,6,16	RTD-A Temp Mode	0=Ambient Control, 1=Ambient Monitor, 2=Line Control, 3=Line Monitor, 4=External Device HWAT - Line Monitor Fuel Oil/Pipe Freeze - Line - Line Control Fuel Oil/Pipe Freeze - Ambient/PASC - Ambient Control/Line Monitor Greasy Waste/Frost Heave - Line Control Floor Heating - Line Control/Ambient Monitor Roof Gutter/Snow Melting - External - Line Monitor/External Device Roof Gutter/Snow Melting - Ambient - Ambient Control/Line Monitor Roof Gutter/Snow Melting - Surface - Line Control Temp Monitor - Line Monitor
1080	3,6,16	RTD-B Temp Mode	0=Ambient Control, 1=Ambient Monitor, 2=Line Control, 3=Line Monitor, 4=External Device HWAT - Line Monitor Fuel Oil/Pipe Freeze - Line - Line Control Fuel Oil/Pipe Freeze - Ambient/PASC - Ambient Control/Line Monitor Greasy Waste/Frost Heave - Line Control Floor Heating - Line Control/Ambient Monitor Roof Gutter/Snow Melting - External - Line Monitor/External Device Roof Gutter/Snow Melting - Ambient - Ambient Control/Line Monitor Roof Gutter/Snow Melting - Surface - Line Control Temp Monitor - Line Monitor
1081	3,6,16	RTD-C Temp Mode	0=Ambient Control, 1=Ambient Monitor, 2=Line Control, 3=Line Monitor, 4=External Device HWAT - Line Monitor Fuel Oil/Pipe Freeze - Line - Line Control Fuel Oil/Pipe Freeze - Ambient/PASC - Ambient Control/Line Monitor Greasy Waste/Frost Heave - Line Control Floor Heating - Line Control/Ambient Monitor Roof Gutter/Snow Melting - External - Line Monitor/External Device Roof Gutter/Snow Melting - Ambient - Ambient Control/Line Monitor Roof Gutter/Snow Melting - Surface - Line Control Temp Monitor - Line Monitor
1082	3,6,16	RTD-D Temp Mode	0=Ambient Control, 1=Ambient Monitor, 2=Line Control, 3=Line Monitor, 4=External Device HWAT - Line Monitor Fuel Oil/Pipe Freeze - Line - Line Control Fuel Oil/Pipe Freeze - Ambient/PASC - Ambient Control/Line Monitor Greasy Waste/Frost Heave - Line Control Floor Heating - Line Control/Ambient Monitor Roof Gutter/Snow Melting - External - Line Monitor/External Device Roof Gutter/Snow Melting - Ambient - Ambient Control/Line Monitor Roof Gutter/Snow Melting - Surface - Line Control Temp Monitor - Line Monitor
1083	3,6,16	Power Cycle Start	High Byte 0-23 Hours, Low Byte 0-59 Minutes
1084	3,6,16	Power Cycle Interval	0=Never, 1=Daily, 2=Weekly, 3=Monthly
1085	3,6,16	spare	
1086	3,6,16	spare	
1087	3,6,16	spare	

Modbus Address	Function Code	Description	Set Mapped Circuit Register Holding Register 1000 prior to using these registers. 1 entry for all 99 address * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits) Contains both Read only and Read/Write data Circuit Number = (addr-1) * 5)+(relay#)
1088	3,6,16	spare	
1089	3,6,16	spare	
1090	3,6,16	spare	
1091	3,6,16	spare	
1092	3,6,16	spare	
1093	3,6,16	spare	
1094	3,6,16	spare	
1095	3,6,16	spare	
1096	3,6,16	spare	
1097	3,6,16	spare	
1098	3,6,16	spare	
1099	3,6,16	spare	
1100	3,6,16	spare	
1101	3,6,16	spare	
1102	3,6,16	spare	
1103	3,6,16	spare	
1104	3,6,16	spare	
1105	3,6,16	spare	
1106	3,6,16	spare	
1107	3,6,16	spare	
1108	3,6,16	spare	
1109	3,6,16	spare	
1110	3,6,16	spare	
1111	3,6,16	spare	
1112	3,6,16	spare	
1113	3,6,16	spare	
1114	3,6,16	spare	
1115	3,6,16	spare	
1116	3,6,16	spare	
1117	3,6,16	spare	
1118	3,6,16	spare	
1119	3,6,16	spare	
1120	3,6,16	spare	
1120	3,6,16	spare - End Mapped Circuit Data	

2.11 ACS-UIT Circuit Schedule Data

Modbus Function Code: 3, 6, 16

Modbus Start Address: 62001

Modbus Block Size: 50

Number of Blocks: 1

Modbus Address	Function Code	Description	Comments: Circuit Number must be written before reading/writing. Each half hour segment can represent four operating modes: 0=Off, 1=Economy Temp, 2=Maintain Temp, 3=Heat Cycle (Heat Cycle only for HWAT with R2 heating cable)
62001		Circuit Number	Target Circuit to read/write: Circuit Number = (Device Address - 1) * 5 + Relay Number
62002		Day Of Week	0=Sunday, 1=Monday, 2=Tuesday, 3=Wednesday, 4=Thursday, 5=Friday, 6=Saturday
62003		Program Schedule 0:00	Program Schedule for day of week above
62004		Program Schedule 0:30	
62005		Program Schedule 1:00	
62006		Program Schedule 1:30	
62007		Program Schedule 2:00	
62008		Program Schedule 2:30	
62009		Program Schedule 3:00	
62010		Program Schedule 3:30	
62011		Program Schedule 4:00	
62012		Program Schedule 4:30	
62013		Program Schedule 5:00	
62014		Program Schedule 5:30	
62015		Program Schedule 6:00	
62016		Program Schedule 6:30	
62017		Program Schedule 7:00	
62018		Program Schedule 7:30	
62019		Program Schedule 8:00	

ACS-UIT Circuit Control Data cont.

Modbus Address	Function Code	Description	Comments: Circuit Number must be written before reading/writing. Each half hour segment can represent four operating modes: 0=Off, 1=Economy Temp, 2=Maintain Temp, 3=Heat Cycle (Heat Cycle only for HWAT with R2 heating cable)
62020		Program Schedule 8:30	
62021		Program Schedule 9:00	
62022		Program Schedule 9:30	
62023		Program Schedule 10:00	
62024		Program Schedule 10:30	
62025		Program Schedule 11:00	
62026		Program Schedule 11:30	
62027		Program Schedule 12:00	
62028		Program Schedule 12:30	
62029		Program Schedule 13:00	
62030		Program Schedule 13:30	
62031		Program Schedule 14:00	
62032		Program Schedule 14:30	
62033		Program Schedule 15:00	
62034		Program Schedule 15:30	
62035		Program Schedule 16:00	
62036		Program Schedule 16:30	
62037		Program Schedule 17:00	

Modbus Address	Function Code	Description	Comments: Circuit Number must be written before reading/writing. Each half hour segment can represent four operating modes: 0=Off, 1=Economy Temp, 2=Maintain Temp, 3=Heat Cycle (Heat Cycle only for HWAT with R2 heating cable)
62038		Program Schedule 17:30	
62039		Program Schedule 18:00	
62040		Program Schedule 18:30	
62041		Program Schedule 19:00	
62042		Program Schedule 19:30	
62043		Program Schedule 20:00	
62044		Program Schedule 20:30	
62045		Program Schedule 21:00	
62046		Program Schedule 21:30	
62047		Program Schedule 22:00	
62048		Program Schedule 22:30	
62049		Program Schedule 23:00	
62050		Program Schedule 23:30	

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