Raychem

# ACS-30

Modbus Protocol Interface Mapping for
ACS-30 Control Systems (European version)
For use only with the ACS-30-EU-UIT2 User Interface Terminal
For Firmware version 1.0.X


chemelex

## SECTION 1

### Introduction

This manual details the Modbus registers of the Raychem ACS-30-EU-UIT2. It is intended to be used by the users' system integrators who wish to interface with their external device (i.e. DCS or BMS system) to the ACS-30-EU-UIT2 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 ACS-30 Advanced Control system has the capability to monitor and control up to 260 heating circuits within the ACS-30-EU-PCM2 power control panels and ACS-30-EU-MONI-RMM2-E remote temperature monitoring modules using an RS-485 network.
This manual should be used in conjunction with the ACS-30-EU-UIT2 Programming Guide EN-RAYCHEMACS30EUUIT-IM-EU0078 and the heating cable application design guide appropriate for the application.

### How to Use This Manual

The ACCS-CRM Modbus register (for the ACS-30 control) 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 synchronisation between the possibility of multiple users and conflicting instructions. Chemelex has tested the system performance and synchronisation when changes are made using the UIT touch screen. System Integrators should not attempt to make setup 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 2.6 Circuit Status 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.

### Modbus Communications

The ACS-30-EU-UIT2 external communications port can be configured for use as a serial 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: 25 milliseconds

The ACS-30-EU-UIT2 mode of transmission is Remote Terminal Unit (RTU). The standard configuration is eight data bits, no parity and two stop bits.

### DISCLAIMER:

MODBUS map information is proprietary and confidential. Use of this information is permitted solely in order to implement a communications link between customer equipment and Raychem controllers. It may not be used for any other purpose, and it is not to be disclosed to 3rd parties without the written consent of Chemelex.

## SECTION 2

### Modbus Register Map

#### > Table: ACS-30-EU-UIT2 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 C |

#### > Table: ACS-30-EU-UIT2 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 | |

#### > Table: ACS-30-EU-UIT2 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-30-EU-UIT2 Alarm Relay #1status | 1 = Off, 0 = On |
| 2 | 2 | ACS-30-EU-UIT2 Alarm Relay #2 status | 1 = Off, 0 = On |
| 3 | 2 | ACS-30-EU-UIT2 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 | |

### > Table: ACS-30-EU-UIT2 Input Registers

Modbus Function Code: 4
Modbus Start Address: 1
Modbus Block Size: 10
Number of Blocks: 1

| Modbus Address | Function Code | Description | Comments |
|---|---|---|---|
| 1 | 4 | ACS-30-EU-UIT2 Device Type | 0x300 |
| 2 | 4 | ACS-30-EU-UIT2 Firmware Version Major | 0-255 |
| 3 | 4 | ACS-30-EU-UIT2 Firmware Version Minor | 0-255 |
| 4 | 4 | ACS-30-EU-UIT2 Firmware Build Number | 0-999 |
| 5 | 4 | ACS-30-EU-UIT2 Firmware Build Number | 0-999 |
| 6 | 4 | ACS-30-EU-UIT2 OS Version Major | 0-255 |
| 7 | 4 | ACS-30-EU-UIT2 OS Version Minor | 0-255 |
| 8 | 4 | ACS-30-EU-UIT2 OS Version Build | 0-999 |
| 9 | 4 | ACS-30-EU-UIT2 OS Version Revision | 0-999 |
| 10 | 4 | spare | |

### > Table: ACS-30-EU-UIT2 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. |
|---|---|---|---|
| 7001 | 4 | Circuit 1 Status1 | Spare = 0x0001;<br>NO_EXTERNAL_INPUT_ALARM = 0x0002;<br>spare = 0x0004;<br>spare = 0x0008;<br>GROUND_FAULT_ALARM = 0x0010;<br>GROUND_FAULT_TRIP_ALARM = 0x0020;<br>HIGH_LIMIT_CUTOUT = 0x0040;<br>FAIL_SAFE_ALARM = 0x0080;<br>spare = 0x0100;<br>spare = 0x0200;<br>RELAY_FAILURE_ALARM = 0x0400;<br>spare = 0x0800;<br>NO_FLOOR_LIMITER_RTD_ALARM = 0x1000;<br>NO_TRACE_BOILER_RTD_ALARM = 0x2000;<br>DEAD_BATTERY = 0x4000;<br>RELAY_STATE = 0x8000; |
| 7002 | 4 | Circuit 1 Status2 | RTD_A_FAILURE_ALARM = 0x0001;<br>RTD_B_FAILURE_ALARM = 0x0002;<br>RTD_C_FAILURE_ALARM = 0x0004;<br>RTD_D_FAILURE_ALARM = 0x0008;<br>RTD_A_LOW_TEMP_ALARM = 0x0010;<br>RTD_B_LOW_TEMP_ALARM = 0x0020;<br>RTD_C_LOW_TEMP_ALARM = 0x0040;<br>RTD_D_LOW_TEMP_ALARM = 0x0080;<br>RTD_A_HIGH_TEMP_ALARM = 0x0100;<br>RTD_B_HIGH_TEMP_ALARM = 0x0200;<br>RTD_C_HIGH_TEMP_ALARM = 0x0400;<br>RTD_D_HIGH_TEMP_ALARM = 0x0800;<br>spare = 0x1000;<br>spare = 0x2000;<br>COMM FAILURE = 0x4000<br>//on any device on Circuit Spare = 0x8000; |
| 7003 | 4 | Circuit 1 Status 3 | Spare |
| 7004 | 4 | Circuit 1 Status 4 | Spare |

## > Table: ACS-30-EU-UIT2 Circuit Status

Modbus Function Code: 4
Modbus Start Address: 20001
Modbus Block Size: 70
Number of Blocks: 500

| Modbus Address | Function Code | Description | Comments: (1 entry for all 99 * 5 relay outputs)<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Circuit Modbus Offset = ((Circuit Number-1) * 70) + 20001 |
|---|---|---|---|
| 20001 | 4 | Circuit Status 1 | Spare = 0x0001;<br>NO_EXTERNAL_INPUT_ALARM = 0x0002;<br>spare = 0x0004;<br>spare = 0x0008;<br>GROUND_FAULT_ALARM = 0x0010;<br>GROUND_FAULT_TRIP_ALARM = 0x0020;<br>HIGH_LIMIT_CUTOUT = 0x0040;<br>FAIL_SAFE_ALARM = 0x0080;<br>spare = 0x0100;<br>spare = 0x0200;<br>RELAY_FAILURE_ALARM = 0x0400;<br>spare = 0x0800;<br>NO_FLOOR_LIMITER_RTD_ALARM = 0x1000;<br>NO_TRACE_BOILER_RTD_ALARM = 0x2000;<br>DEAD_BATTERY = 0x4000;<br>RELAY_STATE = 0x8000; |
| 20002 | 4 | Circuit Status 2 | RTD_A_FAILURE_ALARM = 0x0001;<br>RTD_B_FAILURE_ALARM = 0x0002;<br>RTD_C_FAILURE_ALARM = 0x0004;<br>RTD_D_FAILURE_ALARM = 0x0008;<br>RTD_A_LOW_TEMP_ALARM = 0x0010;<br>RTD_B_LOW_TEMP_ALARM = 0x0020;<br>RTD_C_LOW_TEMP_ALARM = 0x0040;<br>RTD_D_LOW_TEMP_ALARM = 0x0080;<br>RTD_A_HIGH_TEMP_ALARM = 0x0100;<br>RTD_B_HIGH_TEMP_ALARM = 0x0200;<br>RTD_C_HIGH_TEMP_ALARM = 0x0400;<br>RTD_D_HIGH_TEMP_ALARM = 0x0800;<br>spare = 0x1000;<br>spare = 0x2000;<br>COMM FAILURE = 0x4000;<br>//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 Amps |
| 20011 | 4 | Ground Fault | .1 mamps |
| 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 | |
| 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 Amps |
| 20024 | 4 | Max Ground Fault | .1 mamps |
| 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 |

| Modbus Address | Function Code | Description | Comments: (1 entry for all 99 * 5 relay outputs)<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Circuit Modbus Offset = ((Circuit Number-1) * 70) + 20001 |
|---|---|---|---|
| 20027 | 4 | Ground Fault Alarm Value | .1 mamps, latched alarm value associated with Circuit Status above |
| 20028 | 4 | Ground Fault Trip Alarm Value | .1 mamps, latched alarm value associated with Circuit Status above |
| 20029 | 4 | Energy MSW | .01 kWh |
| 20030 | 4 | Energy LSW | .01 kWh |

| Modbus Address | Function Code | Description | Comments: (1 entry for all 99 * 5 relay outputs)<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Circuit Modbus Offset = ((Circuit Number-1) * 70) + 20001 |
|---|---|---|---|
| 20031 | 4 | Computed HWAT Economy Temp | .1 degrees |
| 20032 | 4 | Computed HWAT Maintain Temp | .1 degrees |
| 20033 | 4 | Yesterdays Trace Boiler Min Temp | .1 degrees |
| 20034 | 4 | Yesterdays Trace Boiler Max Temp | .1 degrees |
| 20035 | 4 | Todays Trace Boiler Min Temp | .1 degrees |
| 20036 | 4 | Todays Trace Boiler Max Temp | .1 degrees |
| 20037 | 4 | Economy Duty Cycle | .1 degrees |
| 20038 | 4 | Maintain Duty Cycle | .1 degrees |
| 20039 | 4 | Min Trace Boiler Temp | .1 degrees |
| 20040 | 4 | Max Trace Boiler Temp | .1 degrees |
| 20041 | 4 | Min Floor Limiter Temp | .1 degrees |
| 20042 | 4 | Max Floor Limiter Temp | .1 degrees |
| 20043 | 4 | spare | |
| 20044 | 4 | spare | |
| 20045 | 4 | Reserved | Actual copy of control mode register for this PCM channel |
| 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 | |
| 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 | |

## > Table: ACS-30-EU-UIT2 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-30-EU-UIT2 Tag 0 | ACS-30-EU-UIT2 Tag |
| 2 | 3,6,16 | ACS-30-EU-UIT2 Tag 1 | ACS-30-EU-UIT2 Tag |
| 3 | 3,6,16 | ACS-30-EU-UIT2 Tag 2 | ACS-30-EU-UIT2 Tag |
| 4 | 3,6,16 | ACS-30-EU-UIT2 Tag 3 | ACS-30-EU-UIT2 Tag |
| 5 | 3,6,16 | ACS-30-EU-UIT2 Tag 4 | ACS-30-EU-UIT2 Tag |
| 6 | 3,6,16 | ACS-30-EU-UIT2 Tag 5 | ACS-30-EU-UIT2 Tag |
| 7 | 3,6,16 | ACS-30-EU-UIT2 Tag 6 | ACS-30-EU-UIT2 Tag |
| 8 | 3,6,16 | ACS-30-EU-UIT2 Tag 7 | ACS-30-EU-UIT2 Tag |
| 9 | 3,6,16 | ACS-30-EU-UIT2 Tag 8 | ACS-30-EU-UIT2 Tag |
| **Modbus Address** | **Function Code** | **Description** | **Comments** |
| 10 | 3,6,16 | ACS-30-EU-UIT2 Tag 9 | ACS-30-EU-UIT2 Tag |
| 11 | 3,6,16 | ACS-30-EU-UIT2 Tag 10 | ACS-30-EU-UIT2 Tag |
| 12 | 3,6,16 | ACS-30-EU-UIT2 Tag 11 | ACS-30-EU-UIT2 Tag |
| 13 | 3,6,16 | ACS-30-EU-UIT2 Tag 12 | ACS-30-EU-UIT2 Tag |
| 14 | 3,6,16 | ACS-30-EU-UIT2 Tag 13 | ACS-30-EU-UIT2 Tag |
| 15 | 3,6,16 | ACS-30-EU-UIT2 Tag 14 | ACS-30-EU-UIT2 Tag |
| 16 | 3,6,16 | ACS-30-EU-UIT2 Tag 15 | ACS-30-EU-UIT2 Tag |
| 17 | 3,6,16 | ACS-30-EU-UIT2 Tag 16 | ACS-30-EU-UIT2 Tag |
| 18 | 3,6,16 | ACS-30-EU-UIT2 Tag 17 | ACS-30-EU-UIT2 Tag |
| 19 | 3,6,16 | ACS-30-EU-UIT2 Tag 18 | ACS-30-EU-UIT2 Tag |
| 20 | 3,6,16 | ACS-30-EU-UIT2 Tag 19 | ACS-30-EU-UIT2 Tag |
| 21 | 3,6,16 | ACS-30-EU-UIT2 Tag 20 | ACS-30-EU-UIT2 Tag |
| 22 | 3,6,16 | ACS-30-EU-UIT2 Tag 21 | ACS-30-EU-UIT2 Tag |
| 23 | 3,6,16 | ACS-30-EU-UIT2 Tag 22 | ACS-30-EU-UIT2 Tag |
| 24 | 3,6,16 | ACS-30-EU-UIT2 Tag 23 | ACS-30-EU-UIT2 Tag |
| 25 | 3,6,16 | ACS-30-EU-UIT2 Tag 24 | ACS-30-EU-UIT2 Tag |
| 26 | 3,6,16 | ACS-30-EU-UIT2 Tag 25 | ACS-30-EU-UIT2 Tag |
| 27 | 3,6,16 | ACS-30-EU-UIT2 Tag 26 | ACS-30-EU-UIT2 Tag |
| 28 | 3,6,16 | ACS-30-EU-UIT2 Tag 27 | ACS-30-EU-UIT2 Tag |
| 29 | 3,6,16 | ACS-30-EU-UIT2 Tag 28 | ACS-30-EU-UIT2 Tag |
| 30 | 3,6,16 | ACS-30-EU-UIT2 Tag 29 | ACS-30-EU-UIT2 Tag |
| 31 | 3,6,16 | ACS-30-EU-UIT2 Tag 30 | ACS-30-EU-UIT2 Tag |
| 32 | 3,6,16 | ACS-30-EU-UIT2 Tag 31 | ACS-30-EU-UIT2 Tag |
| 33 | 3,6,16 | ACS-30-EU-UIT2 Tag 32 | ACS-30-EU-UIT2 Tag |
| 34 | 3,6,16 | ACS-30-EU-UIT2 Tag 33 | ACS-30-EU-UIT2 Tag |
| 35 | 3,6,16 | ACS-30-EU-UIT2 Tag 34 | ACS-30-EU-UIT2 Tag |
| 36 | 3,6,16 | ACS-30-EU-UIT2 Tag 35 | ACS-30-EU-UIT2 Tag |
| 37 | 3,6,16 | ACS-30-EU-UIT2 Tag 36 | ACS-30-EU-UIT2 Tag |
| 38 | 3,6,16 | ACS-30-EU-UIT2 Tag 37 | ACS-30-EU-UIT2 Tag |
| 39 | 3,6,16 | ACS-30-EU-UIT2 Tag 38 | ACS-30-EU-UIT2 Tag |
| 40 | 3,6,16 | ACS-30-EU-UIT2 Tag 39 | ACS-30-EU-UIT2 Tag |
| 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-30-EU-UIT2 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-30-EU-UIT2 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-30-EU-UIT2 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 | |
| - | - | | |
| 97 | 3,6,16 | Field bus Number retrys | 1-10 (default 3) |
| 98 | 3,6,16 | Field bus Transmit Delay | 0-1000 milliseconds (default 0) |
| 99 | 3,6,16 | Field Bus Receive Msg Timeout | 0-10000 milliseconds (default 0) Total Time for a receive message timeout. If the complete message is not received by this timeout, then the message is terminated. This is added to the minimum values already hardcoded in the UIT. This is included to extend delays for a radio modem. |
| 100 | 3,6,16 | Field Bus Receive Msg Char Timeout | 0-1000 milliseconds (default 0) Receive Message inter character gap timeout. When a character gap exceeds this time, then the message is terminated. This is added to the minimum values already hardcoded in the UIT. This is included to extend delays for a radio modem. |

> Table: ACS-30-EU-UIT2 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<br>0x0002 = Circuit Database Change Flag<br>0x0004 = Circuit Alarm Status Change Flag<br>0x0008 = Circuit Alarm Reset Change Flag<br>0x0010 = Device List Change Flag (after a scan)<br>0x0020 = Device Alarm Change Flag (comm errors or embed this in device list)<br>0x0040 = spare<br>0x0080 = spare<br>Write 1 to bit position to clear flag |

> Table: ACS-30-EU-UIT2 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 Holding Register 1000 is set to a circuit number (1-500). |
|---|---|---|---|
| 1000 | 3,6,16 | Mapped Circuit Number | 1-500 |

> Table: ACS-30-EU-UIT2 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.<br>1 entry for all 99 addresses * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits.<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Contains both Read only and Read/Write data. |
|---|---|---|---|
| 1001 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 0 | ACS-30-EU-UIT2 Tag (Unicode 39 chars + null) |
| 1002 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 1 | ACS-30-EU-UIT2 Tag |

| Modbus Address | Function Code | Description | Set Mapped Circuit Register Holding (Register 1000) prior to using these registers.<br>1 entry for all 99 addresses * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits.<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Contains both Read only and Read/Write data. |
|---|---|---|---|
| 1003 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 2 | ACS-30-EU-UIT2 Tag |
| 1004 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 3 | ACS-30-EU-UIT2 Tag |
| 1005 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 4 | ACS-30-EU-UIT2 Tag |
| 1006 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 5 | ACS-30-EU-UIT2 Tag |
| 1007 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 6 | ACS-30-EU-UIT2 Tag |
| 1008 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 7 | ACS-30-EU-UIT2 Tag |
| 1009 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 8 | ACS-30-EU-UIT2 Tag |
| 1010 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 9 | ACS-30-EU-UIT2 Tag |
| 1011 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 10 | ACS-30-EU-UIT2 Tag |
| 1012 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 11 | ACS-30-EU-UIT2 Tag |
| 1013 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 12 | ACS-30-EU-UIT2 Tag |
| 1014 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 13 | ACS-30-EU-UIT2 Tag |
| 1015 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 14 | ACS-30-EU-UIT2 Tag |
| 1016 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 15 | ACS-30-EU-UIT2 Tag |
| 1017 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 16 | ACS-30-EU-UIT2 Tag |
| 1018 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 17 | ACS-30-EU-UIT2 Tag |
| 1019 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 18 | ACS-30-EU-UIT2 Tag |
| 1020 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 19 | ACS-30-EU-UIT2 Tag |

| Modbus Address | Function Code | Description | Set Mapped Circuit Register Holding (Register 1000) prior to using these registers.<br>1 entry for all 99 addresses * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits.<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Contains both Read only and Read/Write data. |
|---|---|---|---|
| 1021 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 20 | ACS-30-EU-UIT2 Tag |
| 1022 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 21 | ACS-30-EU-UIT2 Tag |
| 1023 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 22 | ACS-30-EU-UIT2 Tag |
| 1024 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 23 | ACS-30-EU-UIT2 Tag |
| 1025 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 24 | ACS-30-EU-UIT2 Tag |
| 1026 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 25 | ACS-30-EU-UIT2 Tag |
| 1027 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 26 | ACS-30-EU-UIT2 Tag |
| 1028 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 27 | ACS-30-EU-UIT2 Tag |
| 1029 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 28 | ACS-30-EU-UIT2 Tag |
| 1030 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 29 | ACS-30-EU-UIT2 Tag |
| 1031 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 30 | ACS-30-EU-UIT2 Tag |
| 1032 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 31 | ACS-30-EU-UIT2 Tag |
| 1033 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 32 | ACS-30-EU-UIT2 Tag |
| 1034 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 33 | ACS-30-EU-UIT2 Tag |
| 1035 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 34 | ACS-30-EU-UIT2 Tag |
| 1036 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 35 | ACS-30-EU-UIT2 Tag |
| 1037 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 36 | ACS-30-EU-UIT2 Tag |
| 1038 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 37 | ACS-30-EU-UIT2 Tag |
| 1039 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 38 | ACS-30-EU-UIT2 Tag |
| 1040 | 3,6,16 | ACS-30-EU-UIT2 Circuit 1 Tag 39 | ACS-30-EU-UIT2 Tag |
| 1041 | 3,6,16 | Relay Address/Number | Read Only - High Byte (1 thru 99), Low Byte (t1-5 for ACCS-t30) |
| 1042 | 3,6,16 | Circuit Control | **0** = Disable, **1**=Enable, **2** = Force Relay Off, **3** = Force Relay On. However, you may read back a different value. The high byte with a 1 indicates that the circuit is “In Use” meaning it’s parameters are saved in the database. |
| 1043 | 3,6,16 | Control Mode | **0** = Unassigned, **1**= HWAT, **2** = Frost Heave, **3** = Floor Heating, **4** = Pipe Freeze, **5** = Fuell 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 | Floor Heating Sense Mode | 0=Floor Sensing, 1=Room Sensing, 2=Room Sense with Floor Limiter |
| 1046 | 3,6,16 | spare | |
| 1047 | 3,6,16 | HWAT Cable Type | 0=HWAT-L, 1=HWAT-M, 3=HWAT-R |
| 1048 | 3,6,16 | HWAT Pipe Size | 15-100 mm; default 25 |
| 1049 | 3,6,16 | HWAT Insulation Thickness | 9-100 mm, default 13, min/max depends on pipe size |
| 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 Schedule Mode | 0=Constant, 1=Variable |
| 1053 | 3,6,16 | Temperature Alarm filter | 0 - 999 minutes |

| Modbus Address | Function Code | Description | **Set Mapped Circuit Register Holding (Register 1000) prior to using these registers.<br>1 entry for all 99 addresses * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits.<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Contains both Read only and Read/Write data.** |
|---|---|---|---|
| 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, 3=Bracketed Ambient [Roof and Gutter mode only] |
| 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 Power Off Delay | 0 - 10 Hours, External Device Mode Only |
| 1059 | 3,6,16 | PASC/Roof and Gutter Min Ambient Temp | .1 degrees [See limits section above function 4 offset 201] [Used as Ambient Control Range Min for Roof and Gutter Bracketed Ambient Mode] |
| 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 Limiter Temp | .1 degrees |
| 1063 | 3,6,16 | Maintain Temp | .1 degrees [See limits section above function 4 offset 201] [Used as Ambient Control Range Max for Roof and Gutter Bracketed Ambient Mode] |
| 1064 | 3,6,16 | Economy Temp | .1 degrees [See limits section above function 4 offset 201], mode dependant |
| 1065 | 3,6,16 | Hysteresis | .1 degrees [See limits section above function 4 offset 110], mode dependant |
| 1066 | 3,6,16 | Low Temp Alarm | .1 degrees [See limits section above function 4 offset 201], mode dependant |
| 1067 | 3,6,16 | High Temp Alarm | .1 degrees [See limits section above function 4 offset 201], mode dependant |
| 1068 | 3,6,16 | High Limit Temp Cutout | .1 degrees [See limits section above function 4 offset 201], mode dependant |
| 1069 | 3,6,16 | High Limit Temp Cutout Enable | 1=enable, 0=disable |
| 1070 | 3,6,16 | Trace Boiler Low Temp Alarm | .1 degrees [See limits section above function 4 offset 201], mode dependant |

| Modbus Address | Function Code | Description | **Set Mapped Circuit Register Holding (Register 1000) prior to using these registers.<br>1 entry for all 99 addresses * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits.<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Contains both Read only and Read/Write data.** |
|---|---|---|---|
| 1071 | 3,6,16 | Trace Boiler High Temp Alarm | .1 degrees [See limits section above function 4 offset 201], mode dependant |
| 1072 | 3,6,16 | Trace Boiler Enable | 1=enable, 0=disable |
| 1073 | 3,6,16 | Floor Limiter Low Temp Alarm | .1 degrees [See limits section above function 4 offset 201], mode dependant |
| 1074 | 3,6,16 | Floor Limiter High Temp Alarm | .1 degrees [See limits section above function 4 offset 201], mode dependant |
| 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) |

| Modbus Address | Function Code | Description | **Set Mapped Circuit Register Holding (Register 1000) prior to using these registers.<br>1 entry for all 99 addresses * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits.<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Contains both Read only and Read/Write data.** |
|---|---|---|---|
| 1079 | 3,6,16 | RTD-A Temp Mode | 0=Ambient Control, 1=Ambient Monitor, 2=Line Control, 3=Line Monitor, 4=External Device<br>HWAT - Line Monitor/Line Control<br>Fuel Oil/Pipe Freeze - Line - Line Control/External Device<br>Fuel Oil/Pipe Freeze - Ambient/PASC - Ambient Control/Line Monitor/ External Device<br>Greasy Waste/Frost Heave - Line Control<br>Floor Heating - Line Control/Ambient Monitor/Line Monitor/External Device<br>Roof Gutter/Snow Melting - External - Line Monitor/External Device<br>Roof Gutter/Snow Melting - Ambient - Ambient Control/Line Monitor<br>Roof Gutter/Snow Melting - Surface - Line Control<br>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<br>HWAT - Line Monitor/Line Control<br>Fuel Oil/Pipe Freeze - Line - Line Control/External Device<br>Fuel Oil/Pipe Freeze - Ambient/PASC - Ambient Control/Line Monitor/ External Device<br>Greasy Waste/Frost Heave - Line Control<br>Floor Heating - Line Control/Ambient Monitor/Line Monitor/External Device<br>Roof Gutter/Snow Melting - External - Line Monitor/External Device<br>Roof Gutter/Snow Melting - Ambient - Ambient Control/Line Monitor<br>Roof Gutter/Snow Melting - Surface - Line Control<br>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<br>HWAT - Line Monitor/Line Control<br>Fuel Oil/Pipe Freeze - Line - Line Control/External Device<br>Fuel Oil/Pipe Freeze - Ambient/PASC - Ambient Control/Line Monitor/ External Device<br>Greasy Waste/Frost Heave - Line Control<br>Roof Gutter/Snow Melting - External - Line Monitor/External Device<br>Roof Gutter/Snow Melting - Ambient - Ambient Control/Line Monitor<br>Roof Gutter/Snow Melting - Surface - Line Control<br>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<br>HWAT - Line Monitor/Line Control<br>Fuel Oil/Pipe Freeze - Line - Line Control/External Device<br>Fuel Oil/Pipe Freeze - Ambient/PASC - Ambient Control/Line Monitor/ External Device<br>Greasy Waste/Frost Heave - Line Control<br>Roof Gutter/Snow Melting - External - Line Monitor/External Device<br>Roof Gutter/Snow Melting - Ambient - Ambient Control/Line Monitor<br>Roof Gutter/Snow Melting - Surface - Line Control<br>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 | Ground Fault Alarm | .1 mamps |
| 1086 | 3,6,16 | Ground Fault Trip | .1 mamps |
| 1087 | 3,6,16 | Holiday Mode | 0=Disabled, 1=Enabled (everytime this is set, holiday timeout is restarted) |
| 1088 | 3,6,16 | Holiday Days | Min=1, Max=99 (everytime this is set, holiday timeout is restarted) |
| 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 | |

| Modbus Address | Function Code | Description | Set Mapped Circuit Register Holding (Register 1000) prior to using these registers.<br>1 entry for all 99 addresses * 5 relay outputs plus, address 100 is used for accessing 5 Temp Monitor circuits.<br>Circuit Number = ((addr-1)*5)+(relay#)<br>Contains both Read only and Read/Write data. |
|---|---|---|---|
| 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 | |
| - | 3,6,16 | spare | |
| - | 3,6,16 | spare | |
| 1119 | 3,6,16 | spare | |
| 1120 | 3,6,16 | spare | |

### > Table: ACS-30-EU-UIT2 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 100% (Heat Cycle 100% only for HWAT with HWAT-R heating cable) |
|---|---|---|---|
| 62001 | | Circuit Number | Target Circuit to read/write: Circuit Number = ((addr-1)*5)+(relay#) |
| 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 | |
| 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 | |

> Table: ACS-30-EU-UIT2 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 100% (Heat Cycle 100% only for HWAT with HWAT-R heating cable) |
|---|---|---|---|
| 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 | |
| 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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