

Revision Level Updates:

Revision	Date	Description
1	2007/12/14	Initial Revision

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OC485 Modbus protocol for Air Conditioner

Implementation Basics

The OC485 card is configured to act as a slave device on a common network. This common network can be a multi-drop configuration over EIA-485, where multiple slaves reside on a common wire or loop.

Transmission Format

The OC485 interface card supports Modbus RTU (Remote Terminal Unit) transmission modes.

Mode	Baud Rate	Data Bits	Parity Bits	Stop Bits
RTU	9600, 19200 or 38400	8	None	1

Packet Format

Each Modbus packet consists of the following fields:

Address	Function Code	Data Field(s)	CRC Field
1 byte	1 byte	N bytes	2 bytes

Device Address

This field indicates the user assigned address of the OC485 card that is to receive the message sent by the attached master device.

Each slave must be assigned a unique address and only the addressed slave will respond to a query that contains its address. The address range is 1 to 254.

Function Code

The function code field tells the addressed slaves what function to perform. Function codes are specifically designed to invoke a specific action by the slave device. The function code supported by OC485 is:

Code	Function	Description
02	Read Discrete Status	Read the running status of AC. Discrete inputs in the response message are packed as one per bit of a byte, 1=ON and 0=OFF. If the requested quantity of inputs is not a multiple of 8, zeros are padded in the final byte. 2000 continuous status can be read at one time.
04	Read Input Registers	Read the contents of input registers. Data are packed as two bytes per register; the first byte contains the high order bits. 127 continuous registers can be read at one time.
05	Write Single Coil	Write a single output to either ON(0xFF00) or OFF(0x0000) mapped in coil section.
06	Write Single Holding Register	Write a value into a single holding register;

Data Field(s)

The data field varies in length depending on whether the message is a request or a response to a packet. This field typically contains information required by the slave device to perform the command specified or to pass back data to the master device.

Error Check Field

The Error Check Field consists of a 16-bit (2 byte) Cyclical Redundancy Check (CRC16). It allows the receiving device to detect a packet that has been corrupted with transmission errors. The first byte contains the high order bits.

Ther arithmetic of CRC16 :

```
const unsigned8bit ModbusCRCHi[] =
{
    0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
    0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
    0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,
    0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,
    0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x00,0xc1,
    0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,
    0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x00,0xc1,
    0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
    0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
    0x80,0x41,0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,
    0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,
    0x81,0x40,0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,
    0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
    0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
    0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,
    0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
    0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,
    0x80,0x41,0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,
    0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,
    0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
    0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
    0x80,0x41,0x00,0xc1,0x81,0x40
};
const unsigned8bit ModbusCRCLo[] =
{
    0x00,0xc0,0xc1,0x01,0xc3,0x03,0x02,0xc2,0xc6,0x06,
```

```
0x07,0xc7,0x05,0xc5,0xc4,0x04,0xcc,0x0c,0x0d,0xcd,  
0x0f,0xcf,0xce,0x0e,0x0a,0xca,0xcb,0x0b,0xc9,0x09,  
0x08,0xc8,0xd8,0x18,0x19,0xd9,0x1b,0xdb,0xda,0x1a,  
0x1e,0xde,0xdf,0x1f,0xdd,0x1d,0x1c,0xdc,0x14,0xd4,  
0xd5,0x15,0xd7,0x17,0x16,0xd6,0xd2,0x12,0x13,0xd3,  
0x11,0xd1,0xd0,0x10,0xf0,0x30,0x31,0xf1,0x33,0xf3,  
0xf2,0x32,0x36,0xf6,0xf7,0x37,0xf5,0x35,0x34,0xf4,  
0x3c,0xfc,0xfd,0x3d,0xff,0x3f,0x3e,0xfe,0xfa,0x3a,  
0x3b,0xfb,0x39,0xf9,0xf8,0x38,0x28,0xe8,0xe9,0x29,  
0xeb,0x2b,0x2a,0xea,0xee,0x2e,0x2f,0xef,0x2d,0xed,  
0xec,0x2c,0xe4,0x24,0x25,0xe5,0x27,0xe7,0xe6,0x26,  
0x22,0xe2,0xe3,0x23,0xe1,0x21,0x20,0xe0,0xa0,0x60,  
0x61,0xa1,0x63,0xa3,0xa2,0x62,0x66,0xa6,0xa7,0x67,  
0xa5,0x65,0x64,0xa4,0x6c,0xac,0xad,0x6d,0xaf,0x6f,  
0x6e,0xae,0xaa,0x6a,0x6b,0xab,0x69,0xa9,0xa8,0x68,  
0x78,0xb8,0xb9,0x79,0xbb,0x7b,0x7a,0xba,0xbe,0x7e,  
0x7f,0xbf,0x7d,0xbd,0xbc,0x7c,0xb4,0x74,0x75,0xb5,  
0x77,0xb7,0xb6,0x76,0x72,0xb2,0xb3,0x73,0xb1,0x71,  
0x70,0xb0,0x50,0x90,0x91,0x51,0x93,0x53,0x52,0x92,  
0x96,0x56,0x57,0x97,0x55,0x95,0x94,0x54,0x9c,0x5c,  
0x5d,0x9d,0x5f,0x9f,0x9e,0x5e,0x5a,0x9a,0x9b,0x5b,  
0x99,0x59,0x58,0x98,0x88,0x48,0x49,0x89,0x4b,0x8b,  
0x8a,0x4a,0x4e,0x8e,0x8f,0x4f,0x8d,0x4d,0x4c,0x8c,  
0x44,0x84,0x85,0x45,0x87,0x47,0x46,0x86,0x82,0x42,  
0x43,0x83,0x41,0x81,0x80,0x40  
};  
unsigned16bit      ModbusCRC16( unsigned8bit buf[], int len)  
{  
    unsigned8bit  hi = 0xff;  
    unsigned8bit  lo = 0xff;  
    unsigned8bit  i;  
    unsigned16bit crc;  
  
    while(len--)  
    {  
        i = hi ^ *buf++;  
        hi = lo ^ ModbusCRCHi [ i ];  
        lo =ModbusCRCLo [ i ];  
    }  
  
    crc = hi;  
    crc <<= 8;  
    crc += lo;  
    return crc;  
}
```

RTU Framing

The example below shows a typical Q/R from a OC485 card. In common terms, the master device initiates a query asking.

Query function 02

Slave Address	--
Function Code	02H
Start Reg. Hi	--
Start Reg. Lo	--
Bits to Read Hi	--
Bits to Read Hi	--
CRC Hi	--
CRC Lo	--

Query function 04

Slave Address	--
Function Code	04H
Start Reg. Hi	--
Start Reg. Lo	--
Regs to Read Hi	--
Regs to Read Hi	--
CRC Hi	--
CRC Lo	--

Query function 05

Slave Address	--
Function Code	05H
Reg. to set Hi	--
Reg. to set Lo	--
Set value Hi	--
Set value Hi	--
CRC Hi	--
CRC Lo	--

Response function 02

Slave Address	--
Function Code	02H
Byte Count	--
Byte 0	--
Byte 1	--
:	--
:	--
Byte n	--
CRC Hi	--
CRC Lo	--

Response function 04

Slave Address	--
Function Code	04H
Byte Count	--
Data 0 Hi	--
Data 0 Lo	--
:	--
Data n Hi	--
Data n Lo	--
CRC Hi	--
CRC Lo	--

Response function 05

Slave Address	--
Function Code	05H
Reg. to set Hi	--
Reg. to set Lo	--
Set value Hi	--
Set value Hi	--
CRC Hi	--
CRC Lo	--

Query function 06

Slave Address	--
Function Code	06H
Reg. to set Hi	--
Reg. to set Lo	--
Set value Hi	--
Set value Hi	--
CRC Hi	--
CRC Lo	--

Response function 06

Slave Address	--
Function Code	06H
Reg. to set Hi	--
Reg. to set Lo	--
Set value Hi	--
Set value Hi	--
CRC Hi	--
CRC Lo	--

Input Status contents (Queried by function 02)

Data Description	Register	bits	iCOM Ref.
Sleep on Monday	10001	1	U603
Sleep on Tuesday	10002	1	U603
Sleep on Wednesday	10003	1	U603
Sleep on Thursday	10004	1	U603
Sleep on Friday	10005	1	U603
Sleep on Saturday	10006	1	U603
Sleep on Sunday	10007	1	U603
Supply Limit Enable	10008	1	S105
Reheat Lockout	10009	1	S271
Humidifier Lockout	10010	1	S272
Temperature Indication [1]	10011	1	U404
Timer Mode Type	10012	1	U610
Minimum Chilled Water Temp Enable	10013	1	S128
Compressor Pump down Enable	10014	1	A109
Simultaneous Free cool and compressor Enable	10015	1	
Auto Set Enable	10016	1	
Dehumidification Enable	10017	1	
Using Hot Water	10018	1	
Room T/H Alarms Enable	10019	1	U202
Sensor A Alarms Enable	10020	1	U207
Compressor Lockout	10021	1	S274
VSD Fan speed	10022	1	S131
Reserved	10023~10024	2	
Fan On	10025	1	
Cool On	10026	1	
Free Cool On	10027	1	
Hot Water On	10028	1	
Electrical Heater On	10029	1	
Humidification On	10030	1	
Dehumidification On	10031	1	
Audible Alarm On	10032	1	
Reserved	10033	1	
MAIN FAN OVERLOAD	10034	1	
LOSS OF AIRFLOW	10035	1	
LOSS OF FLOW	10036	1	
COMP 1 HIGH PRESSURE	10037	1	
COMP 1 LOW PRESSURE	10038	1	
COMP 1 OVERLOAD	10039	1	
COMP 1 PUMPDOWN FAIL	10040	1	
COMP 2 HIGH PRESSURE	10041	1	
COMP 2 LOW PRESSURE	10042	1	
COMP 2 OVERLOAD	10043	1	

COMP 2 PUMPDOWN FAIL	10044	1
DIG SCROLL1 HIGH TEMP	10045	1
DIG SCROLL2 HIGH TEMP	10046	1
SMOKE DETECTED	10047	1
WATER UNDER FLOOR	10048	1
HUMIDIFIER PROBLEM	10049	1
STBY GLYCOL PUMP ON	10050	1
STANDBY UNIT ON	10051	1
COND PUMP-HIGH WATER	10052	1
ROOM SENSOR FAILURE	10053	1
LOSS COMPRESSOR POWER	10054	1
LOSS OF AIR BLOWER 1	10055	1
Reserved	10056~10057	2
HUMIDIFIER LOW WATER	10058	1
HUMIDIFIER HIGH AMPS	10059	1
HIGH TEMPERATURE	10060	1
LOSS OF POWER	10061	1
Reserved	10062~10063	2
UNSPECIFIED EVENT(S) [1]	10064	1
HIGH CW TEMP	10065	1
RESERVED	10066	1
HIGH ROOM TEMP	10067	1
LOW ROOM TEMP	10068	1
HIGH ROOM HUM	10069	1
LOW ROOM HUM	10070	1
HIGH TEMP SENSOR A	10071	1
LOW TEMP SENSOR A	10072	1
HIGH HUM SENSOR A	10073	1
LOW HUM SENSOR A	10074	1
LOSS OF CW FLOW	10075	1
CLOGGED FILTERS	10076	1
SUPPLY SENSOR FAILURE	10077	1
FREECOOL TEMP SENSOR	10078	1
SENSOR A FAILURE	10079	1
UNIT HRS EXCEEDED	10080	1
COMP 1 HRS EXCEEDED	10081	1
COMP 2 HRS EXCEEDED	10082	1
FC HRS EXCEEDED	10083	1
EL HEAT1 HRS EXCEEDED	10084	1
EL HEAT2 HRS EXCEEDED	10085	1
EL HEAT3 HRS EXCEEDED	10086	1
HW/HG HRS EXCEEDED	10087	1
HUM HRS EXCEEDED	10088	1
DEHUM HRS EXCEEDED	10089	1
Reserved	10090	1
NETWORK FAILURE	10091	1

NO CONNECTION W/UNIT 1	10092	1
UNIT(S) DISCONNECTED	10093	1
UNIT CODE MISSING	10094	1
UNIT CODE MISMATCH	10095	1
CALL SERVICE	10096	1
Low Memory 1	10097	1
RAM / Battery Failure	10098	1
HCB not connected	10099	1
(Parallel flash) MEMORY 1 FAIL	10100	1
(Serial flash) MEMORY 2 FAIL	10101	1
Reserved	10102~10103	2
CUSTOMER INPUT 1	10104	1
CUSTOMER INPUT 2	10105	1
CUSTOMER INPUT 3	10106	1
CUSTOMER INPUT 4	10107	1
DSCROLL 1 SENSOR FAIL	10108	1
DSCROLL 2 SENSOR FAIL	10109	1

Register 10001 is the LSB, and register 10109 is the MSB, the LSB is translated first
Start register in the request frame = the fact register - 10001

Input registers contents (Queried by function 04)

Data Description	Register	Regs	Scale	Note	iCOM Ref.
Vendor Id	30001	1	1		-
Device ID	30002	1	1		-
version number	30003	1	1		-
Ups/Env/Pwr	30004	1	1		-
Reserved	30005~30008	4	-		-
Number of Compressor	30009	1	1		-
Number of Electrical Heaters	30010	1	1		-
Number of Heat Stages	30011	1	1		-
Number of Unit in Teamwork Mode	30012	1	1		-
Compressor Sequence	30013	1	1		-
Hot Gas control	30014	1	1		-
Reheats control	30015	1	1		-
Timer Mode[2]	30016	1	1		U609
Type of DT Room-FC[3]	30017	1	1		S126
Humidity Control Type [4]	30018	1	1		S114
VSD Setpoint	30019	1	1	% (HP)	S132
Supply temperature Limit	30020	1	x10	C°	U106
DT between Room and FC	30021	1	x10	C°	S127
Minimum CW Temperature	30022	1	x10	C°	S128
Temperature Setpoint	30023	1	x10	C°	S102
Temperature proportional band	30024	1	x10	C°	S104
Temperature Dead band	30025	1	x10	C°	S108
Temperature Integration time	30026	1	1	Min	S105
Humidity Setpoint	30027	1	1	%	S113
Humidity proportional band	30028	1	1	%	S115
Humidity Integration time	30029	1	1	Min	S116
Humidity Dead band	30030	1	1	%	S117
Single unit Auto-restart Delay	30031	1	1	Sec	S417
Infrared Flush Rate	30032	1	1	%	S414
Temp Control Type [5]	30033	1	1		S103
Reserved	30034~30039	6	-		-
Sleep Interval 1 Start Time Hour:Minute	30040	1	1	MSB:H LSB:M	U605(FROM)
Sleep Interval 1 End Time Hour:Minute	30041	1	1	MSB:H LSB:M	U605(TO)
Sleep Interval 2 Start Time Hour:Minute	30042	1	1	MSB:H LSB:M	U607(FROM)
Sleep Interval 2 End Time Hour:Minute	30043	1	1	MSB:H LSB:M	U607(TO)
Timer Dead Band	30044	1	X10	C°	U611
Manual VSD Timer/Counter[6]	30045	1	1		
Reserved	30046~30049	5	-		-
High Temperature	30050	1	X10	C°	U203

Low Temperature	30051	1	X10	C°	U204
High Temperature Sensor A	30052	1	X10	C°	U208
Low Temperature Sensor A	30053	1	X10	C°	U209
High Humidity	30054	1	1	%	U205
Low Humidity	30055	1	1	%	U206
High Humidity Sensor A	30056	1	1	%	U210
Low Humidity Sensor A	30057	1	1	%	U211
Reserved	30058~30069	12	-	-	-
Fan Run Hour Threshold	30070	1	1	Hour	U502
Compressor 1 Run Hour Threshold	30071	1	1	Hour	U503
Compressor 2 Run Hour Threshold	30072	1	1	Hour	U504
Humidifier run hours Threshold	30073	1	1	Hour	U510
Dehumidification run hours Threshold	30074	1	1	Hour	U511
CW/FC run hours Threshold	30075	1	1	Hour	U505
Electrical Heaters #1 run hours Threshold	30076	1	1	Hour	U507
Electrical Heaters #2 run hours Threshold	30077	1	1	Hour	U508
Electrical Heaters #3 run hours Threshold	30078	1	1	Hour	U509
Hot Water / Hot Gas run hours Threshold	30079	1	1	Hour	U506
Reserved	30080~30099	20	-	-	-
Operating State [7]	30100	1	1	-	-
Number of Active Events/Alarm	30101	1	-	-	-
Summary Alarm Status [8]	30102	1	-	-	-
Fan Ramp	30103	1	1	%	-
Cooling Ramp	30104	1	1	%	-
Free Cooling Ramp	30105	1	1	%	-
Heating Ramp	30106	1	1	%	-
Humidification Ramp	30107	1	1	%	-
Dehumidifier Ramp	30108	1	1	%	-
FreeCooling Status [9]	30109	1	1	%	U312
Return Temperature	30110	1	x10	C°	-
Actual Temperature SP	30111	1	x10	C°	U301
Supply Temperature	30112	1	x10	C°	-
Actual Supply Temperature SP	30113	1	x10	C°	-
FC Temperature	30115	1	x10	C°	U309
Sensor A Temperature	30116	1	x10	C°	U303
Sensor B Temperature	30117	1	x10	C°	U305
Sensor C Temperature	30118	1	x10	C°	U307
Digi Scroll 1 Temperature	30119	1	x10	C°	U310
Digi Scroll 2 Temperature	30120	1	x10	C°	U311
Reserved	30121~30129	9	-	-	-
Return Humidity	30130	1	1	%	-
Actual Humidity SP	30131	1	1	%	U302

Sensor A Humidity	30132	1	1	%	U304
Sensor B Humidity	30133	1	1	%	U306
Sensor C Humidity	30134	1	1	%	U308
Reserved	30135~30140	6	-	-	-
Fan Run Hour	30141	1	1	Hour	S502
Compressor 1 Run Hour	30142	1	1	Hour	S503
Compressor 2 Run Hour	30143	1	1	Hour	S504
Humidifier run hours	30144	1	1	Hour	S510
Dehumidification run hours	30145	1	1	Hour	S511
Free cooling run hours	30146	1	1	Hour	S505
Electrical Heaters #1 run hours	30147	1	1	Hour	S507
Electrical Heaters #2 run hours	30148	1	1	Hour	S508
Electrical Heaters #3 run hours	30149	1	1	Hour	S509
Hot Water / Hot Gas run hours	30150	1	1	Hour	S506
Daily High Temperature	30151	1	x10	C°	U313
Daily High Temp Time	30152	1	x1	Hh:mm	U313
Daily Low Temperature	30153	1	x10	C°	U314
Daily Low Temp Time	30154	1	x1	Hh:mm	U314
Daily High Humidity	30155	1	x1	%RH	U315
Daily High Hum Time	30156	1	x1	Hh:mm	U315
Daily Low Humidity	30157	1	x1	%RH	U316
Daily Low Hum Time	30158	1	x1	Hh:mm	U316

Start register in the request frame = the fact register - 30001

Output coils contents (Written by function 05)

Data Description	Register	bits	iCOM Ref.
Sleep on Monday	1	1	U603
Sleep on Tuesday	2	1	U603
Sleep on Wednesday	3	1	U603
Sleep on Thursday	4	1	U603
Sleep on Friday	5	1	U603
Sleep on Saturday	6	1	U603
Sleep on Sunday	7	1	U603
Supply Limit Enable	8	1	S105
Reheat Lockout	9	1	S271
Humidifier Lockout	10	1	S272
Temperature Indication [1]	11	1	U404
Timer Mode Type	12	1	U610
Minimum Chilled Water Temp Enable	13	1	S128
Compressor Pump down Enable	14	1	A109
Simultaneous Free cool and compressor Enable	15	1	
Auto Set Enable	16	1	
Dehumidification Enable	17	1	
Using Hot Water	18	1	
Room T/H Alarms Enable	19	1	U202
Sensor A Alarms Enable	20	1	U207
Compressor Lockout	21	1	S274
VSD Fan speed	22	1	S131
Reserved	23~24	2	S131
Unit Control	25	1	
Reset Alarm	26	1	
Acknowledge Alarm	27	1	
Reset Total Run Hours Fan Motor	28	1	U502
Reset Comp1Run Hour	29	1	U503
Reset Comp2Run Hour	30	1	U504
Reset Humidifier Run Hour	31	1	U510
Reset Dehumidifier Run Hour	32	1	U511
Reset CW/FC Run Hour	33	1	U505
Reset E-Heater1RunHour	34	1	U507
Reset E-heater2RunHour	35	1	U508
Reset E-heater3 Run Hour	36	1	U509
Reset HG/HW Run Hour	37	1	U506

Start register in the request frame = the fact register – 1
The value of 0xFF00 means ON, and the value 0x0000 means OFF

Holding registers contents (Written by function 06)

Data Description	Register	Regs	Scale	Note	iCOM Ref.
Reserved	40001~40015	4	-		-
Timer Mode[2]	40016	1	1		U609
Type of DT Room-FC[3]	40017	1	1		S126
Humidity Control Type [4]	40018	1	1		S114
VSD Setpoint	40019	1	1	% (HP)	S132
Supply temperature Limit	40020	1	x10	C°	U106
DT between Room and FC	40021	1	x10	C°	S127
Minimum CW Temperature	40022	1	x10	C°	S128
Temperature Setpoint	40023	1	x10	C°	S102
Temperature proportional band	40024	1	x10	C°	S104
Temperature Dead band	40025	1	x10	C°	S108
Temperature Integration time	40026	1	1	Min	S105
Humidity Setpoint	40027	1	1	%	S113
Humidity proportional band	40028	1	1	%	S115
Humidity Integration time	40029	1	1	Min	S116
Humidity Dead band	40030	1	1	%	S117
Single unit Auto-restart Delay	40031	1	1	Sec	S417
Infrared Flush Rate	40032	1	1	%	S414
Temp Control Type [5]	40033	1	1		S103
Reserved	40034~40039	6	-		-
Sleep Interval 1 Start Time Hour:Minute	40040	1		LSB:Hr	U605(FROM)
Sleep Interval 1 End Time Hour:Minute	40041	1		LSB:Hr	U605(TO)
Sleep Interval 2 Start Time Hour:Minute	40042	1		LSB:Hr	U607(FROM)
Sleep Interval 2 End Time Hour:Minute	40043	1		LSB:Hr	U607(TO)
Timer Dead Band	40044	1	X10	C°	U611
Manual VSD Timer/Counter[6]	40045	1			
Reserved	40046~40049	5	-		-
High Temperature	40050	1	X10	C°	U203
Low Temperature	40051	1	X10	C°	U204
High Temperature Sensor A	40052	1	X10	C°	U208
Low Temperature Sensor A	40053	1	X10	C°	U209
High Humidity	40054	1	1	%	U205
Low Humidity	40055	1	1	%	U206
High Humidity Sensor A	40056	1	1	%	U210
Low Humidity Sensor A	40057	1	1	%	U211
Reserved	40058~40069	12	-		-
Fan Run Hour Threshold	40070	1	1	Hour	U502
Compressor 1 Run Hour Threshold	40071	1	1	Hour	U503
Compressor 2 Run Hour Threshold	40072	1	1	Hour	U504
Humidifier run hours Threshold	40073	1	1	Hour	U510

Dehumidification run hours Threshold	40074	1	1	Hour	U511
CW/FC run hours Threshold	40075	1	1	Hour	U505
Electrical Heaters #1 run hours Threshold	40076	1	1	Hour	U507
Electrical Heaters #2 run hours Threshold	40077	1	1	Hour	U508
Electrical Heaters #3 run hours Threshold	40078	1	1	Hour	U509
Hot Water / Hot Gas run hours Threshold	40079	1	1	Hour	U506

Start register in the request frame = the fact register - 40001

[1] Any non-recognized alarm code by current firmware received from the DS control will trigger this event.

[2] Timer mode: 0 = no, 1= yes.

[3] Type of DT Room-Glycol: 0 = no, 1=contact, 2=value.

[4] Predictive Hum Control: 0=relative, 1=compensated, 2=predictive.

[5] Temp Control Algorithm: 0=proportional, 1=PD, 2=PDI; 3=intelligent;

[6] When VFD is set to manual mode(coil 22), the host can control the VFD by the value of register 40019. The Manual VSD Timer will start to count down. Once it reaches 0, the VFD control mode will switch to auto. The host will need to periodically reset this timer in order to maintain the manual mode. Consult factory for BMS timer information.

[7] Operating State: Bit 0-1: 00 unit off, 01 unit on, 10 unit standby

Bit 2-3: 00 auto, 01 manual

Bit 4-7: 0000 none,
0001 local user,
0010 alarm,
0011 schedule,
0100 remote user,
0101 external device,
0110 local display

[8] Alarm state bit map:

Bit0 =. Reset state

bit1 = Active state ;

bit2 = Acknowledge state,

bit3-7 = Alarm Type,;

00000: Message

00001: Warning

00010: Alarm

[9] Free-cool state: 0= Off, 1= Start, 2= On.