

iCon Modbus Interface Specification

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Reference Documents

Modicon Modbus Protocol Reference Guide (PI_MBUS_300.pdf)

Physical Specification

Interface

Serial Communications Interface Type: **RS485**

Electrical Characteristics: **2 wire, half duplex, multi-drop**

Baud Rate: **9600**

Data Bits: 7, **8 (default)**, 9 data bits (programmable)

Stop Bits: **1 (default)**, 1.5, 2 stop bits (programmable)

Parity: **None (default)**, Odd, even Mark, Space (programmable)

Protocol

Communications Protocol: **Modbus**

Message Format: **Binary RTU (Modbus-B)**

Minimum Response Time: **250 mS**

Maximum Response Time: **500 mS**

Maximum Package Data Rate: **0.5Hz**

Packet Specification

Only Function Codes 3 & 6 are supported

Hex to Binary

Decimal	Hexadecimal	Binary
0	0	0
1	1	1
2	2	10
3	3	11
4	4	100
5	5	101
6	6	110
7	7	111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111

Registers: System Environment

Address Base: 100

The Register is determined by adding the Address Base (100) and the offset for the required parameter (see table)

Example:

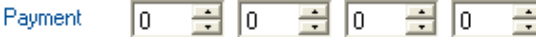
Data address for the System Season is calculated as follows

Address Base for System:	100
Offset for Season:	7

Register Address	107

Offset Table

Offset	Data	Data Type	Unit	Range/ Limit	Read/Write
0					
1	System Rev xx XX.yy.zz	UINT16	n/a	0-99	R
2	System Rev yy xx.YY.zz	UINT16	n/a	0-99	R
3	System Rev zz xx.yy.ZZ	UINT16	n/a	0-99	R
4	Modus Rev	UINT16	n/a	0-99	R
5	Unused				
6	System Mode 0:Normal 1:Heating All On 2:Heating All Off 3: Heating & DHW All Off	ENUM16	n/a	0-3	R/W
7	Season 0: Winter 1: Summer 2: Economy 3: Party	ENUM16	n/a	0-5	R/W

Offset	Data	Data Type	Unit	Range/ Limit	Read/Write
0					
	4: Vacation 5: Custom				
8	Installer Password Digit 1 (D1) D1 D2 D3 D4 	UINT16	n/a	0-99	R/W
9	Installer Password Digit 2 (D2)	UINT16	n/a	0-99	R/W
10	Installer Password Digit 3 (D3)	UINT16	n/a	0-99	R/W
11	Installer Password Digit 4 (D4)	UINT16	n/a	0-99	R/W
12	Eng Password Digit 1 (D1) D1 D2 D3 D4 	UINT16	n/a	0-99	R/W
13	Eng Password Digit 2 (D2)	UINT16	n/a	0-99	R/W
14	Eng Password Digit 3 (D3)	UINT16	n/a	0-99	R/W
15	Eng Password Digit 4 (D4)	UINT16	n/a	0-99	R/W
16	Eng Password Enable 0: Disable 1: Enable	BOOL 16		0,1	R/W
17	Payment Password Digit 1 (D1) D1 D2 D3 D4 	UINT16	n/a	0-99	R/W
18	Payment Password Digit 2 (D2)	UINT16	n/a	0-99	R/W
19	Payment Password Digit 3 (D3)	UINT16	n/a	0-99	R/W
20	Payment Password Digit 4 (D4)	UINT16	n/a	0-99	R/W
21	Payment Password Enable 0: Disable 1: Enable	BOOL 8		0,1	R/W
22	Comm Port	UINT16	n/a	0-99	R/W

Offset	Data	Data Type	Unit	Range/ Limit	Read/Write
0					
23	Comm Port Enable 0: Disable 1: Enable	BOOL 16		0,1	R/W
24	Maximum Zones	UINT16	n/a	0-31	R/W
25	Maximum I/O	UINT16	n/a	0-8	R/W
26	Maximum Aux Sensors	UINT16	n/a	0-8	R/W
27	Heating/Cooling Maximum Set-Point for zone types: UFH, UPROBE or RAD	UINT16	n/a	0-32	R/W
28	Heating/Cooling Minimum Set-Point for zone types: UFH, UPROBE or RAD	UINT16	n/a	0-32	R/W
29	Heating/Cooling Maximum UFH Setback	UINT16	n/a	0-10	R/W
30	Heating/Cooling Minimum UFH Setback	UINT16	n/a	0-10	R/W
31	Heating/Cooling Maximum Probe Set-point for zone type: PROBE	UINT16	n/a	0-200	R/W
32	Heating/Cooling Minimum Probe Set-point for zone type: PROBE	UINT16	n/a	0-200	R/W
33	Heating/Cooling Min Cooling	UINT16	n/a	0-31	R/W
34	Heating/Cooling Frost Protection	UINT16	n/a	0-31	R/W
35	Heating/Cooling Sensor OffLine Operation 1: Force Off 0: Follow Req State	UINT16	n/a	0,1	R/W
36	DHW Maximum Set-Point	UINT16	n/a	0-90	R/W
37	DHW Minimum Set-Point	UINT16	n/a	0-90	R/W
38	DHW Hysteresis	UINT16	n/a	0-31	R/W
39	DHW Legionella Day of Week 0: Sunday 1: Monday 6: Saturday	UINT16	Day of Week	0-6	R/W
40	DHW Legionella Hour of Day	UINT16	Hours	0-23	R/W

Offset	Data	Data Type	Unit	Range/ Limit	Read/Write
0					
41	DHW Legionella Duration (Hrs) 0= 1hr 1= 2hr	UINT16	n/a	0-31	R/W
42	DHW Sensor OffLine Operation 0: Follow Req State 1: Force Off	UINT16	n/a	0-1	R/W
43	Schedule Type 0: 7 Days 1: 5/2 Day 2: 24 Hour	UINT16	n/a	0-2	R/W
44	Schedule Single Set-Point 0: Multiple Set-Point 1: Single Set-Point	UINT16	n/a	0-1	R/W
45	I/O Cycle Interval (Hrs)	UINT16	n/a	0-31	R/W
46	I/O Duration (Mins)	UINT16	n/a	0-255	R/W
47	Remote Control 0: Normal Operation 1: Remote Control Lock out the central station UI and take control of zone scheduling. The following should be noted carefully for remote control operation: Note1: The system will revert to Normal Operation if no master command is received over a period of 10 minutes. Note 2: A message indicating “Remote Control” will be displayed on the Home screen. Note 3: The Home Screen Master and Zone control buttons will be locked. Likewise, the Vacation button. The System, Help and Setup buttons will remain active.	UINT16	n/a	0-1	R/W

Offset	Data	Data Type	Unit	Range/ Limit	Read/Write
0					
	Note 4: The following will be de-activated: (a) Zone Optimization (b) UFH, UPROBE Boost (c) Web Server Note 5: All scheduling will be controlled remotely by (a) Setting the Zone Mode to “schedule” [0] or “schedule Ht&Cool” [6] (b) Setting the Zone Set-Point (c) Setting the Zone Schedule State Note 6: The Zone SP and Mode registers must be read before written to as there parameters may be changed at the sensor.				

Registers: Zone Status/Control

Address Base: 200

The Register is calculated by adding the Address Base (200) and Zone times 25 and the offset for the required parameter (see table)

Note: Zone referenced (e.g. Zone 1 is “0”)

Up to 32 points (zones) can be read in a block.

Example:

The Data address for the Zone 5 Set-point is calculated as follows

Address Base for Zone Control:	200
Block offset (5-1)*25	100
Offset for Zone Set-point	4

Address	304

Offset Table

Offset	Data	Data Type	Unit	Range/ Limit	Read/ Write
0	Zone Alarm Status Mask Bit Set 0x00001 Communications Error 0x00002 Ch1 Error 0x00004 Ch2 Error 0x00008 Unused 0x00010 Unused 0x00020 Unused 0x00040 Unused 0x00080 Unused	UINT16	n/a	n/a	R
1	Zone Activation Status Mask Bit Set 0x00001 Heating Active* 0x00001 Schedule Active* 0x00002 Cooling Active 0x00004 Fan 1 Active 0x00008 Fan 2 Active 0x00010 Fan 3 Active 0x00020 Ch1 Active	UINT16	n/a	n/a	R

	0x00040 Ch2 Active 0x00080 Heating & Cooling 0x00100 Request for Ht/Sched 0x00200 Frost Protection Active** *Zone Type determines weather Bit applies to Heating or Schedule. ** Heating is active when frost protection is active				
2	Zone Temperature Air (Ch1)	INT16	°C	0-99	R
3	Zone Temperature Probe (Ch2)	INT16	°C	0-99	R
4	Zone Set-Point	UINT16	°C	0-90	R/W
5	Zone Set-Back	UINT16	°C	0-10	R/W
6	Zone Set-Point Off	UINT16	°C	0-99	R/W
7	Zone Boost Heat	UINT16	°C	0-10	R/W
8	Zone Dead-band	UINT16	°C	0-10	R/W
9	Zone Fan 1	UINT16	°C	0-10	R/W
10	Zone Fan 2	UINT16	°C	0-10	R/W
11	Zone Fan 3	UINT16	°C	0-10	R/W
12	Zone Mode 0:Schedule 1:Disable 2:OffForToday 3:OnFor1Hr 4:OnFor2Hr 5:OnFor3Hr 6: Scheduled Heating & Cooling 7:Stop 8:OverRideOn 9:OverRideOff	ENUM16	n/a	0-9	R/W
13	Zone Optimization 0:OFF 1:CURVE1 2:CURVE2	ENUM16	n/a	0-4	R/W

	3:CURVE3 4:AUTO				
14	Zone Type 0:UFH 1:UPROBE 2:RAD 3:PROBE 4:DHW 5:SCHED	ENUM16	n/a	0-5	R/W
15	Zone Lockout 0: Off 1: On	ENUM16	n/a	0-1	R/W
16	Zone Temperature Ch1 (Zone Types: 0:UFH, 2:RAD) Ch2 (Zone Types 1:UPROBE, 3:PROBE, 4:DHW) Note 1: “0” is returned for Zone type: 5:SCHED	INT16	°C	0-99	R
17	Zone Schedule State 0:Off 1:ON This command is used when remotely controlling the Zone Schedule. Note 1: Zone Optomizatn must be turned off Note 2: Zone Schedule Time Slots must be set to 0	UINT16	n/a	0-1	R/W
18	Zone Heating/Cooling Status 0: Not Calling for Heat or Cooing 1: Calling for Heat 2: Calling for Cooling	UINT16	n/a	0-2	R
19	Zone Fan Cooling Control 0: Auto 1:Off 2:Fan Speed 1	UINT16	n/a	0-4	R/W

	3:Fan Speed 2 4:Fan Speed 2				
20	Zone VRF Set-Point	UINT16	°C	0-90	R
21	Zone VRF ON/Off 0: Not cooling of heating 1: Zone has been calling for heat for “VRF Heating Time” (see Reg24) Or Zone is Cooling.	UINT16	na	0-1	R
22	Zone VRF Mode 0: Not heating or cooling 1: Zone has been calling for heat for “VRF Heating Time” (see Reg24) 2: Not implemented 3: Not implemented 4: if zone is calling for cooling	UINT16	na	0-4	R
23	Zone VRF Fan Speed 0: Fans OFF 1: Fan Speed 1 2: Fan Speed 2 3: Fan Speed 3	UINT16	na	0-4	R
24	Zone VRF Heating Time See VRF Mode (Reg 22) and VRF ON/Off A minimum time of 1 minute applies	UINT16	min	1-3	R/W

Registers: Zone Schedule

Only the active schedule is visible. Zone schedule changes will only apply to the active schedule.

Base Address: 1000

The Register is calculated by adding the Address Base (1000) and Zone times 1,000 and Day (Mon:0 Tue:1...) times 100 and Time Slot times 10 to the requires Zone Schedule Parameter offset (see table).

Note: Zone zero referenced (e.g. Zone 1 is “0”)

Up to 32 points (zones) can be read in a block.

Example:

The Register for Wednesday, Zone 5, Time slot 2, Set-Point, is calculated as follows

Address Base for Zone Control:	1,000
Offset for Zone 5 (1,000*4) Zone is Zero referenced	4,000
Offset for Day: Wed (100*3)	300

Day Indices are:

- 0: Sunday
- 1: Monday
- 2: Tuesday
- 3: Wednesday
- 4: Thursday
- 5: Friday
- 6: Saturday

Offset for Time Slot 2 (10*1)	10
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- 1. There are a maximum of 5 times slots which are zero references
- 2. Set to 0 When changing the number of time slots

Data Address for Zone Set-point	2

Address	5,312

Offset Table

Offset	Data Name	Data Type	Unit	Range/Limit	Read/Write
0	Zone Alarm Status Mask Bit Set 0x001 Communications Error 0x002 Ch1 (Air) Error 0x004 Ch2 (Air) Error 0x008 Unused 0x010 Unused 0x020 Unused 0x040 Unused 0x080 Unused	UINT16	n/a	n/a	R
1	Number of Zone Time Slots Note: The Time Slot Offset should be set to 0.	UINT16	n/a	0-5	R/W
2	Zone Set-Point	UINT16	°C	0-99	R/W
3	Zone Start Hour	UINT16	Hrs	0-23	R/W
4	Zone Start Minute	UINT16	Mins	0-59	R/W
5	Zone End Hour	UINT16	Hrs	0-23	R/W
6	Zone End Minute	UINT16	Mins	0-59	R/W

Registers: I/O Status/Control

Base Address: 33000

The Register is calculated by adding the Address Base for IO Control (33000) and Offset for the IO module (I/O Module number times 10, note the I/O Module number is zero referenced) and Offset for the required relay parameter(see table).

Note: The I/O Module is zero referenced (e.g. Module 1 is “0”)

Up to 8 points (IO Modules) can be read in a block.

For example the address for Relay outputs on I/O Module 5 is calculated as follows: .

Data Address Base for IO Control:	33,000
Offset for I/O Module 5 (10*4) Module is Zero referenced	40
Data Address for Relay Outputs	1

Address	33,041

Offset Table

Offset	Data Name	Data Type	Unit	Range/Limit	Read/Write
0	IO Alarm Status Mask 0x001 Communications Error 0x002 Unused 0x004 Unused 0x008 Unused 0x010 Unused 0x020 Unused 0x040 Unused 0x080 Unused	UINT16	n/a	n/a	R
1	Relay 1-16 Output Status Mask: 0x00001 : Relay 1 OPEN(ON) .. 0x08000 : Relay 16 OPEN (ON)	UINT16	n/a	n/a	R/W
3	Discrete Input Status	UINT16	n/a	n/a	R/W

	Mask: 0x001 : Input 1 OPEN(ON) .. 0x080 : Input 8 OPEN (ON)				
4	DAC	UINT16	n/a	n/a	R/W
5	Input Alarm Status Mask: 0x001 : Input Alarm 1 OPEN(ON) .. 0x080 : Input Alarm 8 OPEN(ON)	UINT16	n/a	n/a	R/W

Register: Zone Label

Base Address: 34000

The Register is calculated by adding the Data Address Base for Zone Label (34000) and Data Address for the Zone Label (see table).

Note: Zone is zero referenced (e.g. Zone 1 is “0”)

For example the address for Relay outputs on I/O Module 5 is calculated as follows:

Address Base for Zone Label:	34,000
Offset for Zone Label 6	5

Address	33,005

Offset Table

Offset	Data	Data Type	Unit	Range/ Limit	Read/ Write
0 ..31	Label Zone 1..32	INT16*	n/a	n/a	R

String are returned as 2 byte values byte 0 – Low Byte, byte 1 – Hi byte

Register Addressing – Sp, T, Mode, State

Zone Idx	Set-Point	Temp	Mode	State
1	204	202	212	217
2	229	227	237	242
3	254	252	262	267
4	279	277	287	292
5	304	302	312	317
6	329	327	337	342
7	354	352	362	367
8	379	377	387	392
9	404	402	412	417
10	429	427	437	442
11	454	452	462	467
12	479	477	487	492
13	504	502	512	517
14	529	527	537	542
15	554	552	562	567
16	579	577	587	592
17	604	602	612	617
18	629	627	637	642
19	654	652	662	667
20	679	677	687	692
21	704	702	712	717
22	729	727	737	742
23	754	752	762	767
24	779	777	787	792
25	804	802	812	817
26	829	827	837	842
27	854	852	862	867
28	879	877	887	892
29	904	902	912	917
30	929	927	937	942
31	954	952	962	967
32	979	977	987	992