

CoolGate Reference Manual



CoolGate
CoolGate PRO

Interface Adapter
MODBUS to VRV,VRF
Air Conditioning
Systems



PRELIMINARY DATA

Revision 0.5 3/2/2010

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1 Release Notes

Document revision 0.5 Tuesday, March 02, 2010

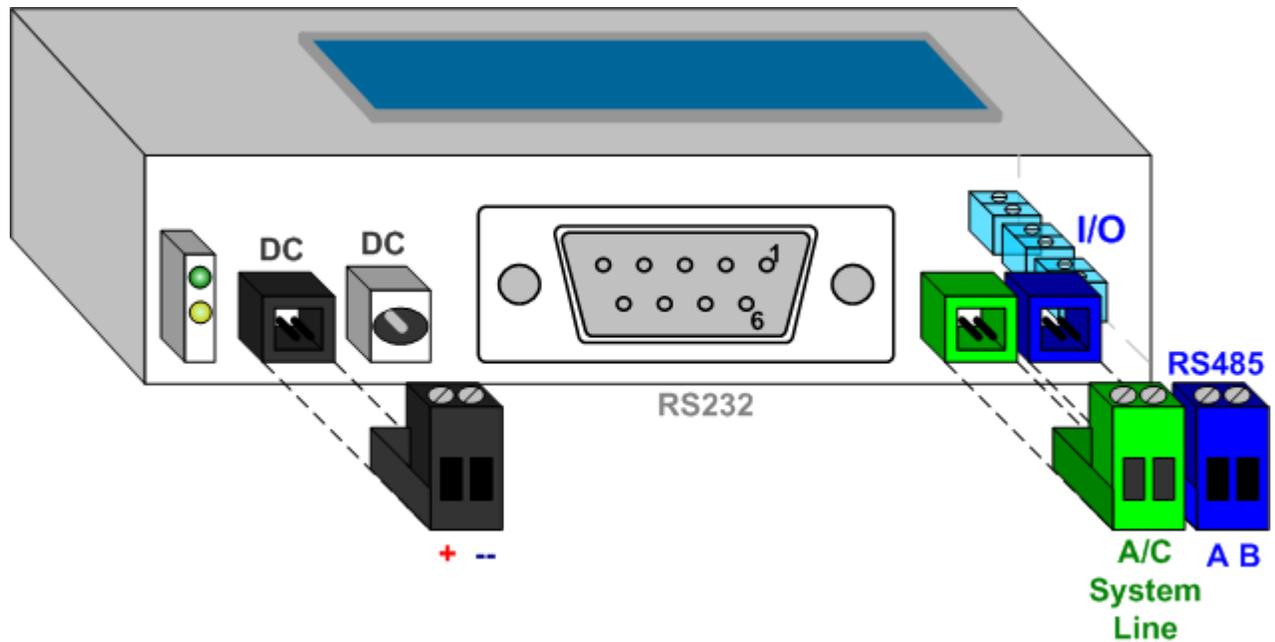
Type	Compatible FW version	
	CoolGate	CoolGate PRO
1000D	2.3.8	2.3.8
2000S	2.3.8	n.a.
3000T	2.3.8	n.a.
4000M	2.3.9	n.a.

Document revision history

- 0.5
 - Fixed failure translation table for CoolGate S type
 - Added Modbus frame format definition
- 0.4
 - Added failure code translation for CoolGate S and T types



2 CoolGate Layout



CoolGate supports Modbus RTU Transmission Mode with following byte format:

Baud Rate	9600
Start Bits	1
Data Bits	8
Parity	No
Stop Bits	1

Physical bytes transmission is done over “Two-Wire” electrical interface in accordance with EIA/TIA-485 standard via 485-A and 485-B terminals.

CoolGate Modbus address is reported on LCD. It can be changed via RS232 terminal with **set modaddr <ADDR>** command. For details see [CoolMaster Programmers Reference Manual \(PRM\)](#).



3 General Address Allocation

Coils,Registers, Address Range (hex)	Address Zone Size	Access To	Translation
0001 - 0800	128x16=0x800	Indoor System Parameters via AirNet 000-127	AirNet = (Address-1 >> 4)
0801 - 0900	16x16=0x100	Outdoor System Parameters 0-15	Outdoor System = (Address-1-0x800)>>4
0901 - 0B00	32x16=0x200	Outdoor Unit 0-15	Outdoor Unit = (Address-1-0x900)>>5
0B01 - 1000	0x500	Reserved	
1001 - F640	0xE640	Indoor Units 1-00 - 15-99	Indoor System = (Address-1-0x1000) >> 12 + 1 Indoor Unit = ((Address-1-0x1000) >> 4) & 0xFF
F641 - F700	0xC0	Reserved	
F701 - F800	0x100	Indoor Group Operations	
F801 - FFFF	0x800	Reserved	

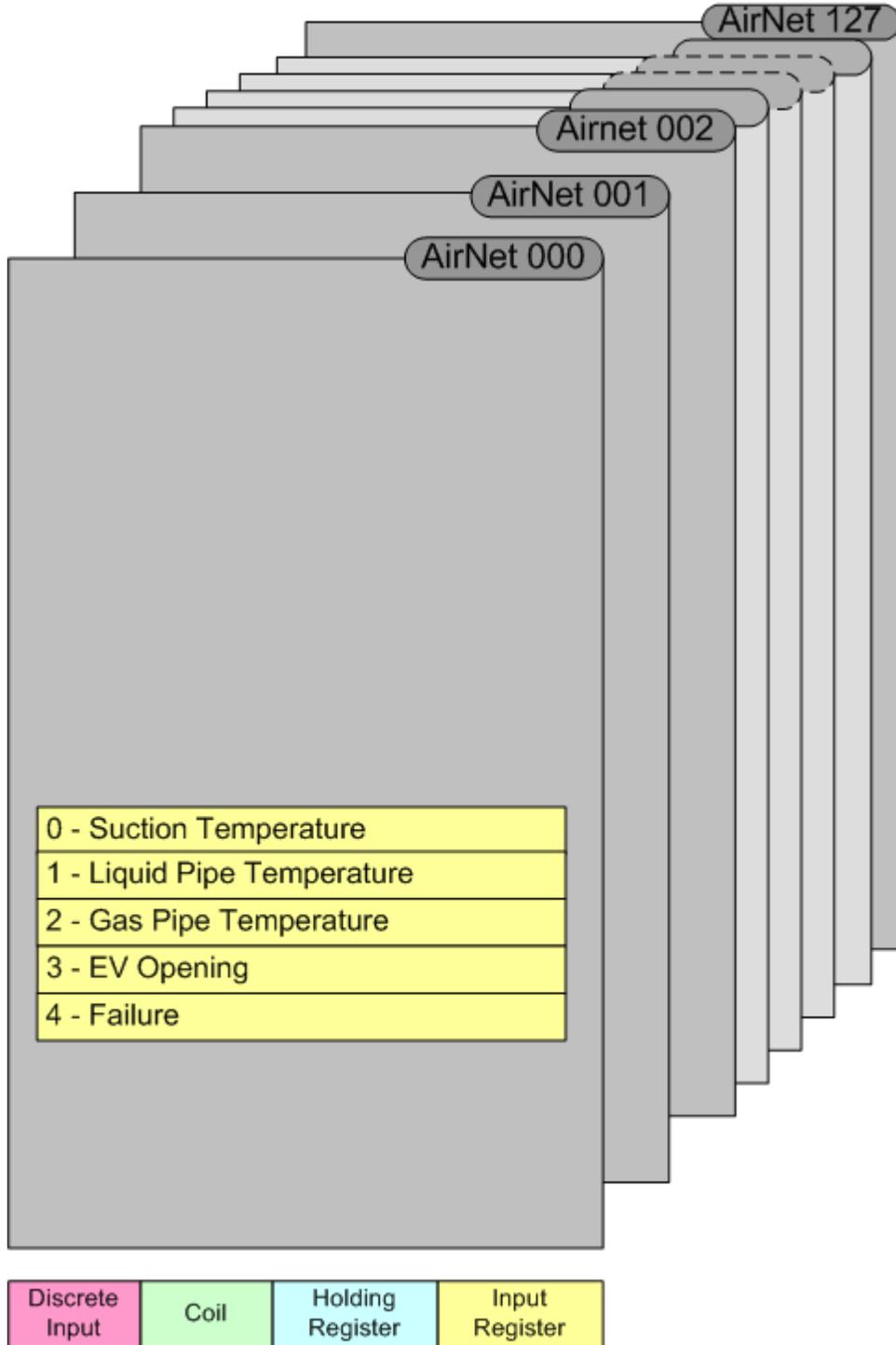
Backward conversion

Indoor System Parameters via AirNet 000-127	Address = AirNet << 4 +1
Outdoor System 0-15	Address = (OutdoorSystem << 4)+0x800 +1



4 Indoor System Parameters Map

Access to Indoor system parameters available in CoolGate PRO only.



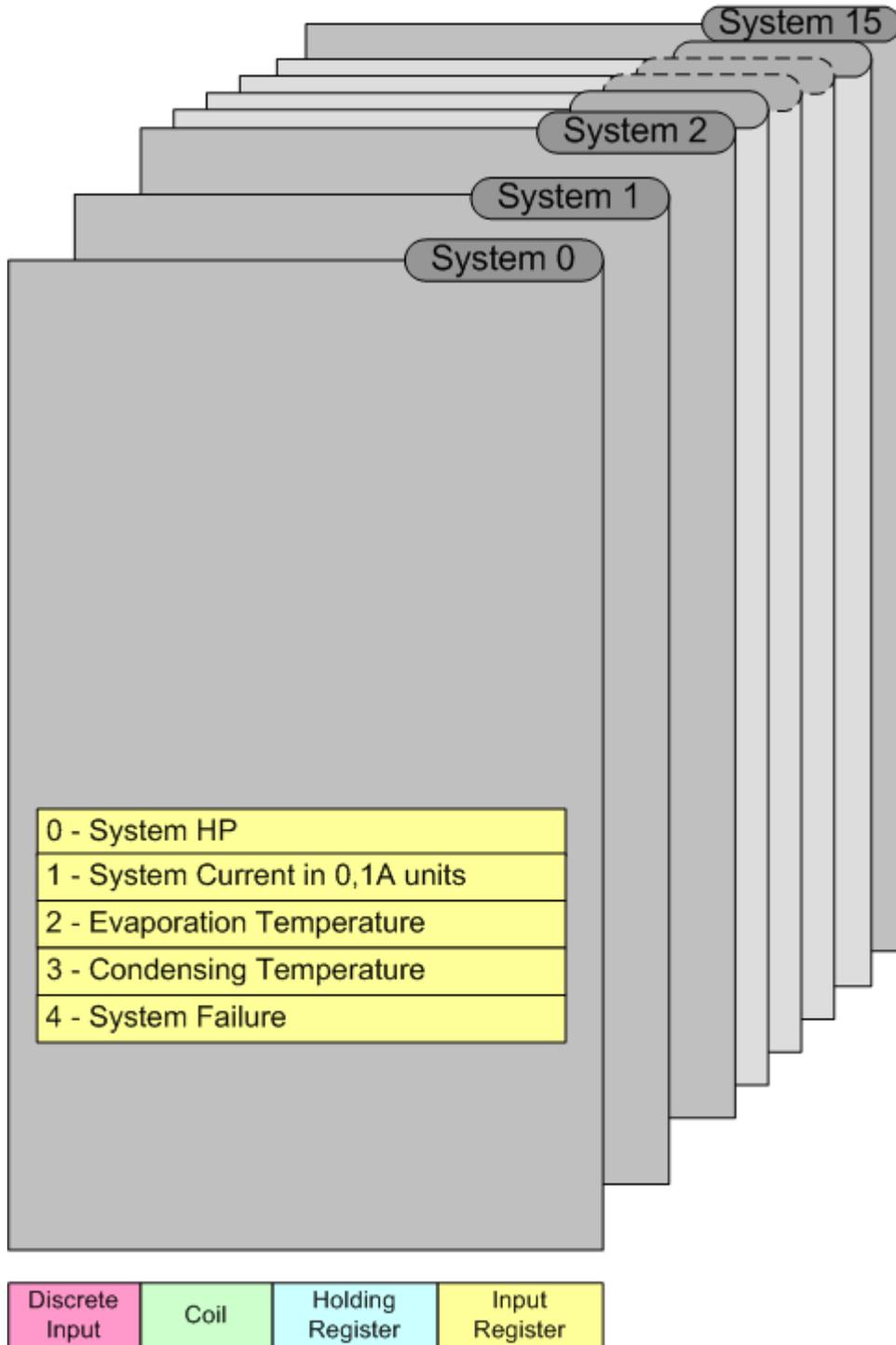


AirNet Address	Base Address (hex)	Discrete Inputs (hex)	Coils (hex)	Holding Registers (hex)	Input Registers (hex)	
000	0001				0001	Suction Temperature
					0002	Liquid Pipe Temperature
					0003	Gas Pipe Temperature
					0004	EV Opening
					0005	Failure Code
...						
127	07F1				07F1	Suction Temperature
					07F2	Liquid Pipe Temperature
					07F3	Gas Pipe Temperature
					07F4	EV Opening
					07F5	Failure Code



5 Outdoor Systems

Access to Outdoor system parameters available in CoolGate PRO only.



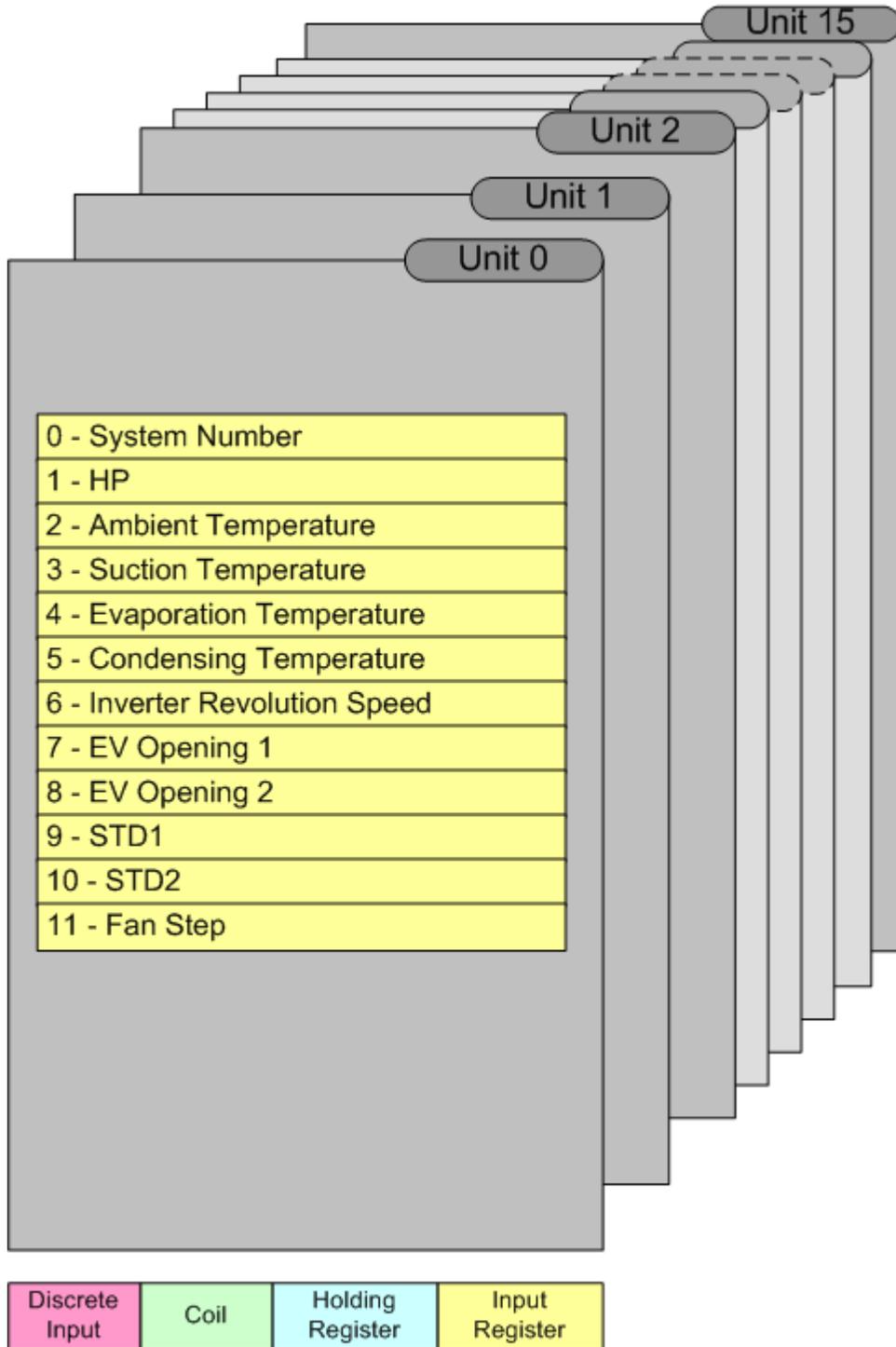


Outdoor System	Base Address (hex)	Discrete Inputs (hex)	Coils (hex)	Holding Registers (hex)	Input Registers (hex)	
0	0801				0801	System HP
					0802	System Current in 0.1A units
					0803	Evaporation Temperature
					0804	Condensing Temperature
					0805	System Failure
...						
15	08F1				08F1	System HP
					08F2	System Current in 0.1A units
					08F3	Evaporation Temperature
					08F4	Condensing Temperature
					08F5	System Failure



6 Outdoor Units

Access to Outdoor system parameters available in CoolGate PRO only.





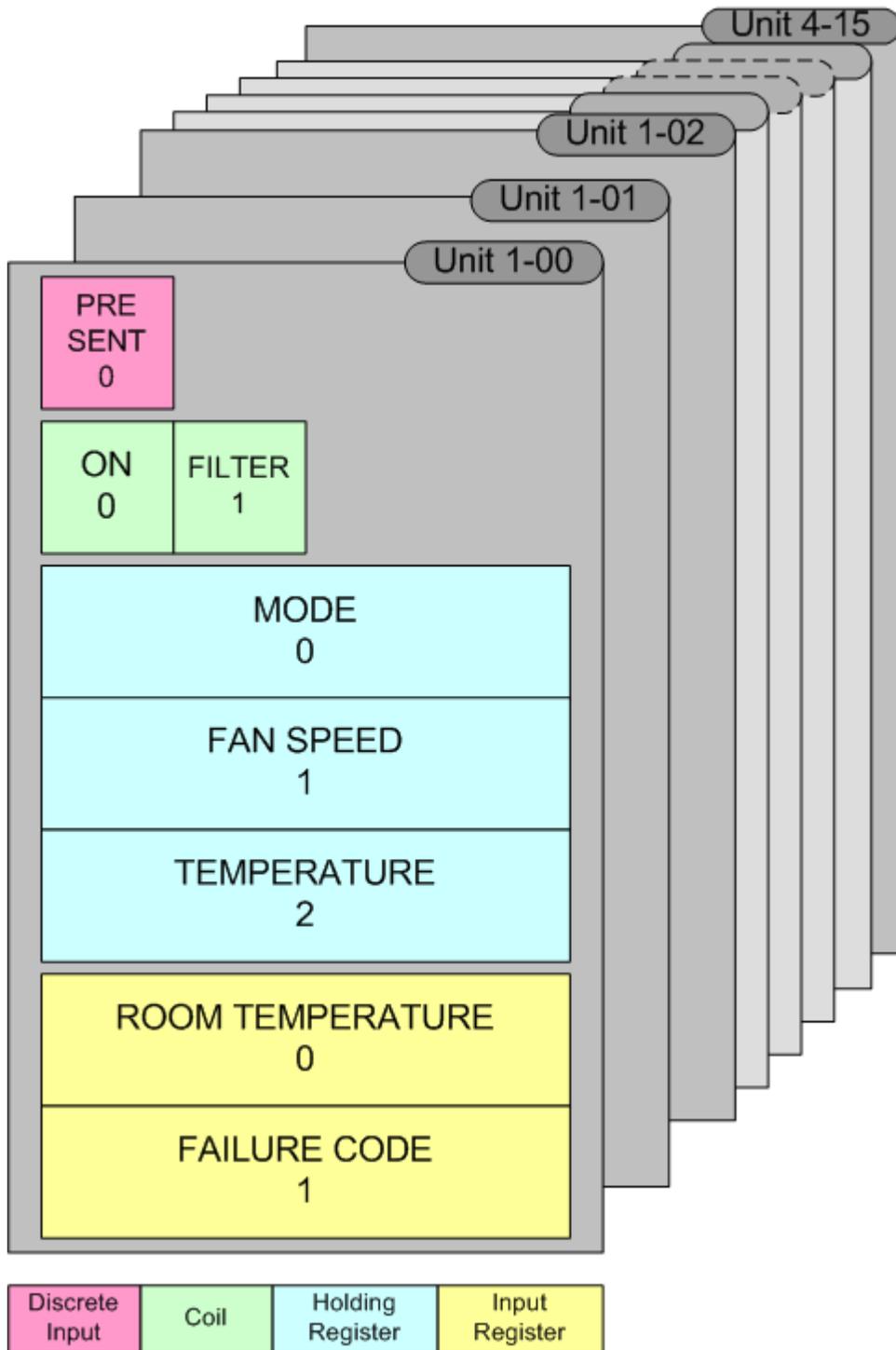
Outdoor Unit	Base Address (hex)	Discrete Inputs (hex)	Coils (hex)	Holding Registers (hex)	Input Registers (hex)	
0	0901				0901	System Number
					0902	HP
					0903	Ambient Temperature
					0904	Suction Temperature
					0905	Evaporation Temperature
					0906	Condensing Temperature
					0907	Inverter Revolution Speed
					0908	EV Opening 1
					0909	EV Opening 2
					090A	STD1
					090B	STD2
					090C	Fan Step

...

Outdoor Unit	Base Address (hex)	Discrete Inputs (hex)	Coils (hex)	Holding Registers (hex)	Input Registers (hex)	
15	0AE1				0AE1	System Number
					0AE2	HP
					0AE3	Ambient Temperature
					0AE4	Suction Temperature
					0AE5	Evaporation Temperature
					0AE6	Condensing Temperature
					0AE7	Inverter Revolution Speed
					0AE8	EV Opening 1
					0AE9	EV Opening 2
					0AEA	STD1
					0AEB	STD2
					0AEC	Fan Step



7 Indoors Address Map





Indoor Unit	Base Address (hex)	Discrete Inputs (hex)		Coils (hex)		Holding Registers (hex)		Input Registers (hex)	
1-00	1001	1001	Present	1001	On/Off	1001	Mode	1001	Room Temperature
				1002	Filter Sign	1002	Fan Speed	1002	Failure Code
						1003	Temperature		
1-01	1011	1011	Present	1011	On/Off	1011	Mode	1011	Room Temperature
				1012	Filter Sign	1012	Fan Speed	1012	Failure Code
						1013	Temperature		
1-02	1021	1021	Present	1021	On/Off	1021	Mode	1021	Room Temperature
				1022	Filter Sign	1022	Fan Speed	1022	Failure Code
						1023	Temperature		
...									
2-00	2001	2001	Present	2001	On/Off	2001	Mode	2001	Room Temperature
				2002	Filter Sign	2002	Fan Speed	2002	Failure Code
						2003	Temperature		
...									
3-00	3001	3001	Present	3001	On/Off	3001	Mode	3001	Room Temperature
				3002	Filter Sign	3002	Fan Speed	3002	Failure Code
						3003	Temperature		
...									
4-00	4001	4001	Present	4001	On/Off	4001	Mode	4001	Room Temperature
				4002	Filter Sign	4002	Fan Speed	4002	Failure Code
						4003	Temperature		
...									
4-15	40F1	40F1	Present	40F1	On/Off	40F1	Mode	40F1	Room Temperature
				40F2	Filter Sign	40F2	Fan Speed	40F2	Failure Code
						40F3	Temperature		

Indoor Unit - Indoor Unit number same as in **stat** command.

CoolGate Type	Indoor Unit number	Modbus Map Base Address
1000D	1-00 .. 1-15	0x1001 .. 0x10F1
	2-00 .. 2-15	0x2001 .. 0x20F1
	3-00 .. 3-15	0x3001 .. 0x30F1
	4-00 .. 4-15	0x4001 .. 0x40F1
2000S 3000T	1-01 .. 1-99	0x1011 .. 0x1631
	2-01 .. 2-99	0x2011 .. 0x2631

	F-01 .. F-99	0xF011 .. 0xF631
4000M	001 .. 050	0x1011 .. 0x1321

Mode Encoding

Cool	0
Heat	1
Auto	2
Dry	3
Haux	4
Fan	5

Fan Speed Encoding

Low	0
Medium	1
High	2



Auto	3
Top	4



8 Indoor Group Operations

Discrete Inputs (hex)		Coils (hex)		Holding Registers (hex)		Input Registers (hex)	
		F701	All On/Off (Write Only)				



9 Failure Codes

Below is a translation table between failure code register value and failure code used by A/C manufacturer. For M model register value and failure code are the same and requires no translation.

• For CoolGate D type

000 (0x00) - 00	001 (0x01) - 01	002 (0x02) - 02	003 (0x03) - 03
004 (0x04) - 04	005 (0x05) - 05	006 (0x06) - 06	007 (0x07) - 07
008 (0x08) - 08	009 (0x09) - 09	010 (0x0A) - 0A	011 (0x0B) - 0H
012 (0x0C) - 0C	013 (0x0D) - 0J	014 (0x0E) - 0E	015 (0x0F) - 0F
016 (0x10) - A0	017 (0x11) - A1	018 (0x12) - A2	019 (0x13) - A3
020 (0x14) - A4	021 (0x15) - A5	022 (0x16) - A6	023 (0x17) - A7
024 (0x18) - A8	025 (0x19) - A9	026 (0x1A) - AA	027 (0x1B) - AH
028 (0x1C) - AC	029 (0x1D) - AJ	030 (0x1E) - AE	031 (0x1F) - AF
032 (0x20) - C0	033 (0x21) - C1	034 (0x22) - C2	035 (0x23) - C3
036 (0x24) - C4	037 (0x25) - C5	038 (0x26) - C6	039 (0x27) - C7
040 (0x28) - C8	041 (0x29) - C9	042 (0x2A) - CA	043 (0x2B) - CH
044 (0x2C) - CC	045 (0x2D) - CJ	046 (0x2E) - CE	047 (0x2F) - CF
048 (0x30) - E0	049 (0x31) - E1	050 (0x32) - E2	051 (0x33) - E3
052 (0x34) - E4	053 (0x35) - E5	054 (0x36) - E6	055 (0x37) - E7
056 (0x38) - E8	057 (0x39) - E9	058 (0x3A) - EA	059 (0x3B) - EH
060 (0x3C) - EC	061 (0x3D) - EJ	062 (0x3E) - EE	063 (0x3F) - EF
064 (0x40) - H0	065 (0x41) - H1	066 (0x42) - H2	067 (0x43) - H3
068 (0x44) - H4	069 (0x45) - H5	070 (0x46) - H6	071 (0x47) - H7
072 (0x48) - H8	073 (0x49) - H9	074 (0x4A) - HA	075 (0x4B) - HH
076 (0x4C) - HC	077 (0x4D) - HJ	078 (0x4E) - HE	079 (0x4F) - HF
080 (0x50) - F0	081 (0x51) - F1	082 (0x52) - F2	083 (0x53) - F3
084 (0x54) - F4	085 (0x55) - F5	086 (0x56) - F6	087 (0x57) - F7
088 (0x58) - F8	089 (0x59) - F9	090 (0x5A) - FA	091 (0x5B) - FH
092 (0x5C) - FC	093 (0x5D) - FJ	094 (0x5E) - FE	095 (0x5F) - FF
096 (0x60) - J0	097 (0x61) - J1	098 (0x62) - J2	099 (0x63) - J3
100 (0x64) - J4	101 (0x65) - J5	102 (0x66) - J6	103 (0x67) - J7
104 (0x68) - J8	105 (0x69) - J9	106 (0x6A) - JA	107 (0x6B) - JH
108 (0x6C) - JC	109 (0x6D) - JJ	110 (0x6E) - JE	111 (0x6F) - JF
112 (0x70) - L0	113 (0x71) - L1	114 (0x72) - L2	115 (0x73) - L3
116 (0x74) - L4	117 (0x75) - L5	118 (0x76) - L6	119 (0x77) - L7
120 (0x78) - L8	121 (0x79) - L9	122 (0x7A) - LA	123 (0x7B) - LH
124 (0x7C) - LC	125 (0x7D) - LJ	126 (0x7E) - LE	127 (0x7F) - LF
128 (0x80) - P0	129 (0x81) - P1	130 (0x82) - P2	131 (0x83) - P3
132 (0x84) - P4	133 (0x85) - P5	134 (0x86) - P6	135 (0x87) - P7
136 (0x88) - P8	137 (0x89) - P9	138 (0x8A) - PA	139 (0x8B) - PH
140 (0x8C) - PC	141 (0x8D) - PJ	142 (0x8E) - PE	143 (0x8F) - PF
144 (0x90) - U0	145 (0x91) - U1	146 (0x92) - U2	147 (0x93) - U3
148 (0x94) - U4	149 (0x95) - U5	150 (0x96) - U6	151 (0x97) - U7
152 (0x98) - U8	153 (0x99) - U9	154 (0x9A) - UA	155 (0x9B) - UH
156 (0x9C) - UC	157 (0x9D) - UJ	158 (0x9E) - UE	159 (0x9F) - UF
160 (0xA0) - M0	161 (0xA1) - M1	162 (0xA2) - M2	163 (0xA3) - M3
164 (0xA4) - M4	165 (0xA5) - M5	166 (0xA6) - M6	167 (0xA7) - M7
168 (0xA8) - M8	169 (0xA9) - M9	170 (0xAA) - MA	171 (0xAB) - MH
172 (0xAC) - MC	173 (0xAD) - MJ	174 (0xAE) - ME	175 (0xAF) - MF
176 (0xB0) - 30	177 (0xB1) - 31	178 (0xB2) - 32	179 (0xB3) - 33
180 (0xB4) - 34	181 (0xB5) - 35	182 (0xB6) - 36	183 (0xB7) - 37
184 (0xB8) - 38	185 (0xB9) - 39	186 (0xBA) - 3A	187 (0xBB) - 3H
188 (0xBC) - 3C	189 (0xBD) - 3J	190 (0xBE) - 3E	191 (0xBF) - 3F
192 (0xC0) - 40	193 (0xC1) - 41	194 (0xC2) - 42	195 (0xC3) - 43
196 (0xC4) - 44	197 (0xC5) - 45	198 (0xC6) - 46	199 (0xC7) - 47
200 (0xC8) - 48	201 (0xC9) - 49	202 (0xCA) - 4A	203 (0xCB) - 4H
204 (0xCC) - 4C	205 (0xCD) - 4J	206 (0xCE) - 4E	207 (0xCF) - 4F
208 (0xD0) - 50	209 (0xD1) - 51	210 (0xD2) - 52	211 (0xD3) - 53
212 (0xD4) - 54	213 (0xD5) - 55	214 (0xD6) - 56	215 (0xD7) - 57
216 (0xD8) - 58	217 (0xD9) - 59	218 (0xDA) - 5A	219 (0xDB) - 5H
220 (0xDC) - 5C	221 (0xDD) - 5J	222 (0xDE) - 5E	223 (0xDF) - 5F
224 (0xE0) - 60	225 (0xE1) - 61	226 (0xE2) - 62	227 (0xE3) - 63
228 (0xE4) - 64	229 (0xE5) - 65	230 (0xE6) - 66	231 (0xE7) - 67
232 (0xE8) - 68	233 (0xE9) - 69	234 (0xEA) - 6A	235 (0xEB) - 6H
236 (0xEC) - 6C	237 (0xED) - 6J	238 (0xEE) - 6E	239 (0xEF) - 6F
240 (0xF0) - ?0	241 (0xF1) - ?1	242 (0xF2) - ?2	243 (0xF3) - ?3
244 (0xF4) - ?4	245 (0xF5) - ?5	246 (0xF6) - ?6	247 (0xF7) - ?7
248 (0xF8) - ?8	249 (0xF9) - ?9	250 (0xFA) - ?A	251 (0xFB) - ?H
252 (0xFC) - ?C	253 (0xFD) - ?J	254 (0xFE) - ?E	255 (0xFF) - ?F



- For CoolGate S or T type

000 (0x00) - 000	001 (0x01) - 001	002 (0x02) - 002	003 (0x03) - 003
004 (0x04) - 004	005 (0x05) - 005	006 (0x06) - 006	007 (0x07) - 007
008 (0x08) - 008	009 (0x09) - 009	010 (0x0A) - 010	011 (0x0B) - 011
012 (0x0C) - 012	013 (0x0D) - 013	014 (0x0E) - 014	015 (0x0F) - 015
016 (0x10) - 016	017 (0x11) - 017	018 (0x12) - 018	019 (0x13) - 019
020 (0x14) - 020	021 (0x15) - 021	022 (0x16) - 022	023 (0x17) - 023
024 (0x18) - 024	025 (0x19) - 025	026 (0x1A) - 026	027 (0x1B) - 027
028 (0x1C) - 028	029 (0x1D) - 029	030 (0x1E) - 030	031 (0x1F) - 031
032 (0x20) - 100	033 (0x21) - 101	034 (0x22) - 102	035 (0x23) - 103
036 (0x24) - 104	037 (0x25) - 105	038 (0x26) - 106	039 (0x27) - 107
040 (0x28) - 108	041 (0x29) - 109	042 (0x2A) - 110	043 (0x2B) - 111
044 (0x2C) - 112	045 (0x2D) - 113	046 (0x2E) - 114	047 (0x2F) - 115
048 (0x30) - 116	049 (0x31) - 117	050 (0x32) - 118	051 (0x33) - 119
052 (0x34) - 120	053 (0x35) - 121	054 (0x36) - 122	055 (0x37) - 123
056 (0x38) - 124	057 (0x39) - 125	058 (0x3A) - 126	059 (0x3B) - 127
060 (0x3C) - 128	061 (0x3D) - 129	062 (0x3E) - 130	063 (0x3F) - 131
064 (0x40) - 200	065 (0x41) - 201	066 (0x42) - 202	067 (0x43) - 203
068 (0x44) - 204	069 (0x45) - 205	070 (0x46) - 206	071 (0x47) - 207
072 (0x48) - 208	073 (0x49) - 209	074 (0x4A) - 210	075 (0x4B) - 211
076 (0x4C) - 212	077 (0x4D) - 213	078 (0x4E) - 214	079 (0x4F) - 215
080 (0x50) - 216	081 (0x51) - 217	082 (0x52) - 218	083 (0x53) - 219
084 (0x54) - 220	085 (0x55) - 221	086 (0x56) - 222	087 (0x57) - 223
088 (0x58) - 224	089 (0x59) - 225	090 (0x5A) - 226	091 (0x5B) - 227
092 (0x5C) - 228	093 (0x5D) - 229	094 (0x5E) - 230	095 (0x5F) - 231
096 (0x60) - F00	097 (0x61) - F01	098 (0x62) - F02	099 (0x63) - F03
100 (0x64) - F04	101 (0x65) - F05	102 (0x66) - F06	103 (0x67) - F07
104 (0x68) - F08	105 (0x69) - F09	106 (0x6A) - F10	107 (0x6B) - F11
108 (0x6C) - F12	109 (0x6D) - F13	110 (0x6E) - F14	111 (0x6F) - F15
112 (0x70) - F16	113 (0x71) - F17	114 (0x72) - F18	115 (0x73) - F19
116 (0x74) - F20	117 (0x75) - F21	118 (0x76) - F22	119 (0x77) - F23
120 (0x78) - F24	121 (0x79) - F25	122 (0x7A) - F26	123 (0x7B) - F27
124 (0x7C) - F28	125 (0x7D) - F29	126 (0x7E) - F30	127 (0x7F) - F31
128 (0x80) - 400	129 (0x81) - 401	130 (0x82) - 402	131 (0x83) - 403
132 (0x84) - 404	133 (0x85) - 405	134 (0x86) - 406	135 (0x87) - 407
136 (0x88) - 408	137 (0x89) - 409	138 (0x8A) - 410	139 (0x8B) - 411
140 (0x8C) - 412	141 (0x8D) - 413	142 (0x8E) - 414	143 (0x8F) - 415
144 (0x90) - 416	145 (0x91) - 417	146 (0x92) - 418	147 (0x93) - 419
148 (0x94) - 420	149 (0x95) - 421	150 (0x96) - 422	151 (0x97) - 423
152 (0x98) - 424	153 (0x99) - 425	154 (0x9A) - 426	155 (0x9B) - 427
156 (0x9C) - 428	157 (0x9D) - 429	158 (0x9E) - 430	159 (0x9F) - 431
160 (0xA0) - 500	161 (0xA1) - 501	162 (0xA2) - 502	163 (0xA3) - 503
164 (0xA4) - 504	165 (0xA5) - 505	166 (0xA6) - 506	167 (0xA7) - 507
168 (0xA8) - 508	169 (0xA9) - 509	170 (0xAA) - 510	171 (0xAB) - 511
172 (0xAC) - 512	173 (0xAD) - 513	174 (0xAE) - 514	175 (0xAF) - 515
176 (0xB0) - 516	177 (0xB1) - 517	178 (0xB2) - 518	179 (0xB3) - 519
180 (0xB4) - 520	181 (0xB5) - 521	182 (0xB6) - 522	183 (0xB7) - 523
184 (0xB8) - 524	185 (0xB9) - 525	186 (0xBA) - 526	187 (0xBB) - 527
188 (0xBC) - 528	189 (0xBD) - 529	190 (0xBE) - 530	191 (0xBF) - 531
192 (0xC0) - L00	193 (0xC1) - L01	194 (0xC2) - L02	195 (0xC3) - L03
196 (0xC4) - L04	197 (0xC5) - L05	198 (0xC6) - L06	199 (0xC7) - L07
200 (0xC8) - L08	201 (0xC9) - L09	202 (0xCA) - L10	203 (0xCB) - L11
204 (0xCC) - L12	205 (0xCD) - L13	206 (0xCE) - L14	207 (0xCF) - L15
208 (0xD0) - L16	209 (0xD1) - L17	210 (0xD2) - L18	211 (0xD3) - L19
212 (0xD4) - L20	213 (0xD5) - L21	214 (0xD6) - L22	215 (0xD7) - L23
216 (0xD8) - L24	217 (0xD9) - L25	218 (0xDA) - L26	219 (0xDB) - L27
220 (0xDC) - L28	221 (0xDD) - L29	222 (0xDE) - L30	223 (0xDF) - L31
224 (0xE0) - P00	225 (0xE1) - P01	226 (0xE2) - P02	227 (0xE3) - P03
228 (0xE4) - P04	229 (0xE5) - P05	230 (0xE6) - P06	231 (0xE7) - P07
232 (0xE8) - P08	233 (0xE9) - P09	234 (0xEA) - P10	235 (0xEB) - P11
236 (0xEC) - P12	237 (0xED) - P13	238 (0xEE) - P14	239 (0xEF) - P15
240 (0xF0) - P16	241 (0xF1) - P17	242 (0xF2) - P18	243 (0xF3) - P19
244 (0xF4) - P20	245 (0xF5) - P21	246 (0xF6) - P22	247 (0xF7) - P23
248 (0xF8) - P24	249 (0xF9) - P25	250 (0xFA) - P26	251 (0xFB) - P27
252 (0xFC) - P28	253 (0xFD) - P29	254 (0xFE) - P30	255 (0xFF) - P31