CoolMasterNet
CooLinkNet
CooLinkHub

Modbus Integration Guidelines

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1 Connection

CoolAutomation devices support Modbus RTU and Modbus IP protocols with accordance to the Modbus Organization specifications listed below:

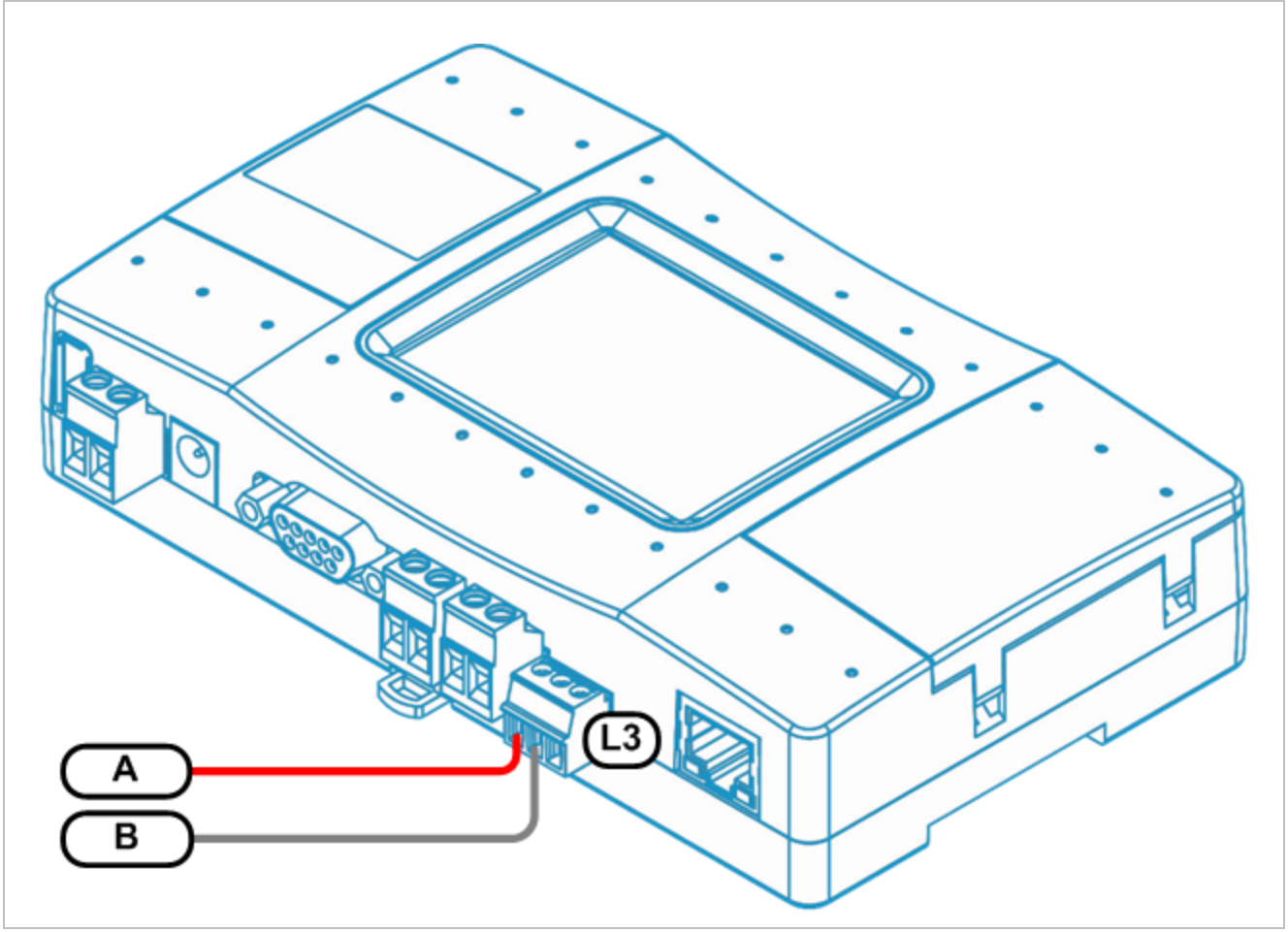
- MODBUS Application Protocol Specification
- MODBUS over Serial Line Specification and Implementation Guide
- MODBUS Messaging on TCP/IP Implementation Guide

Modbus RTU is supported by CoolMasterNet, CooLinkNet and CooLinkHub, Modbus IP is supported by CoolMasterNet and CooLinkHub.

1.1 Modbus RTU Connection

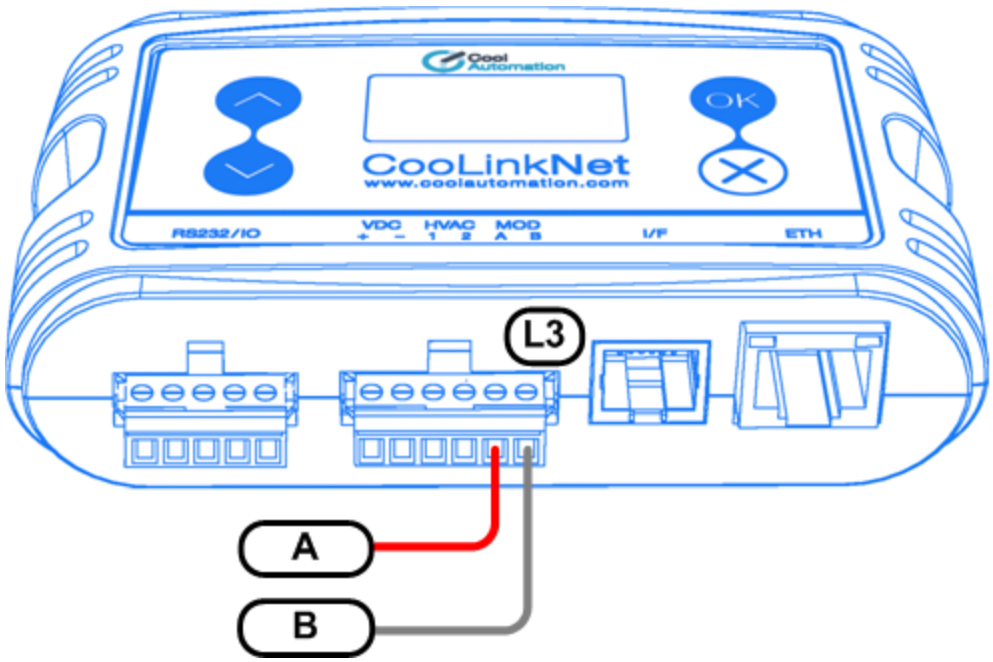
In Modbus RTU mode physical connection of the CoolAutomation devices is done over “Two-Wire” electrical interface in accordance with EIA/TIA-485 standard. Connection is made via 485-A and 485-B terminals. Ground wire connection is not mandatory but highly recommended.

CoolMasterNet Modbus RTU Connection



In CoolMasterNet Line L3 is recommended for Modbus RTU connection, although Lines L4, L5, L6 and L7 can also be used for that purpose. Picture above shows connection to Line L3.

CooLinkNet/CooLinkHub Modbus RTU Connection



In CooLinkNet/CooLinkHub **only** Line L3 can be used for Modbus RTU connection.

1.2 Modbus IP Connection

Modbus IP is supported in CoolMasterNet and CooLinkHub devices. Device acts as a Modbus Server, communicating on the Ethernet TCP/IP network. Physical connection in this case is made via RJ45 Ethernet connector.

2 Configuration

CoolAutomation device must be properly configured to support Modbus functionality. Configuration is made via CoolAutomation's proprietary ASCII_IF interface described in details in Programmer Reference Manual (PRM) document for the corresponding device.
It is allowed to have a number of simultaneous Modbus RTU and Modbus IP connections to the same device.

2.1 Modbus RTU Configuration

Modbus RTU interface module of the CoolAutomation device has to be activated by assigning appropriate communication Line. In CoolMasterNet it is highly recommended to use Line L3, although it is possible to use any of the L4, L5, L6, L7 lines. In CooLinkNet and CooLinkHub Line L3 usage for Modbus RTU is mandatory.

CoolMasterNet Modbus RTU activation:

```
>line type L3 CG5
OK, Boot Required!
```

CooLinkNet/CooLinkHub Modbus RTU activation:

```
>line type L3 CLMB

OK, Boot Required!
```

To check if Modbus RTU module is already activated and read it 's parameters, including Slave Address, **line** command should be used:

CoolMasterNet:

```
>line
  L1: DK Master U00/G00 myid:0B
   Tx:2/2 Rx:2/2 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L2: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L3: CG5 Modbus Address:0x50(80) 9600_8N1
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L4: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L5: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L6: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L7: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L8: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
OK
```

CooLinkNet/CooLinkHub:

```
>line
  L1: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L2: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L3: CLMB Address:0x50(80) 9600_8N1
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L4: M1M2 Slave U00/G00 Not Connected
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
  L5: Unused
   Tx:0/0 Rx:0/0 TO:0/0 CS:0/0 Col:0/0 NAK:0/0
OK
```

Next: For CoolMasterNet and CooLinkHub VA's have to be configured to use Modbus RTU module. See: VA's Configuration.

2.1.1 Modbus Slave Address

Modbus Slave Address can be queried with **line** command or changed with **line myid** command. In the example below the new Slave Address will become 0x51 (81 decimal) after power reset:

```
>line myid L3 51
OK, Boot Required!
```

The default (factory set) Modbus Slave Address for CoolAutomation devices is 0x50 hexadecimal (80 decimal).

2.1.2 Modbus RTU Frame Format

The default Modbus RTU frame format in CoolAutomation devices is 9600_8N1:

Baud Rate	9600 bps
Data Bits	8
Parity	None
Stop Bits	1

Frame format parameters are configurable with **`line baud`** command:

```
>line baud L3 19200_8N2
OK, Boot Required!
```

New frame format will be 19200 bps, 8 data bits, no parity, 2 stop bits.

2.2 Modbus IP Configuration

Modbus IP is supported in CoolMasterNet and CooLinkHub devices. CooLinkNet has no Modbus IP support. Modbus IP module is activated with below command:

```
>modbus IP enable
OK, Boot Required!
```

Modbus IP server is started by device only after it establishes an Ethernet link and gets proper IP address (dynamic via DHCP or static). Ethernet and IP management is done with **ifconfig** command that is out of the spec of this document.

To query Modbus IP status use **`modbus`** command without parameters:

```
>modbus
ModBus IP     : enabled
server port   : 502
CG4/5 ignore  : none
OK
```

The default TCP/IP port number used by Modbus IP Server is 502. This is "well-known" Ethernet port assigned for the Modbus TCP/IP protocol. If required port number can be changed (new port number will be 503):

```
>modbus server port 503
OK, Boot Required!
```

Next: VA's have to be configured to use Modbus IP Server. See: VA's Configuration.

2.3 VA's Configuration

VA's are used in CoolMasterNet and CooLinkHub devices. For CooLinkNet device this chapter is not applicable. VA's -Virtual Addresses are used in order to simplify translation of the Indoor Unit identifier/number - UID into addresses of related Modbus objects: holding registers, input registers, coils and discrete inputs.

UID is a string in format **Ln.XYY**. For Example:
L1.102 - Indoor Unit 102 on line L1
L2.003 - Indoor Unit 003 on line L2
List of UID's detected (visible) by CoolAutomation device can be retrieved with **`ls`** command.

```
>ls
L1.100 ON  19C 30C High Fan  OK   # 0
L1.101 OFF 28C 23C High Cool OK   - 0
```

Each UID can have none, one or a number of associated VA's. VA's are plain numbers starting from 1. Device can automatically allocate and associate VA's with existing (visible by **ls** command) UID's:

```
>va auto
OK
```

To query allocated VA's use **va** command without parameters:

```
>va
INDOORS
L1.100 --> 0001 [Hex: 0x0011 | Dec: 00017]
L1.101 --> 0002 [Hex: 0x0021 | Dec: 00033]
OK
```

VA reporting string has following fields:

UID	Associated VA	Base Address Hex	Base Address Decimal
L1.100	**0001**	**0x0011**	**00017**

Base Address is a starting address of the Modbus objects block related to VA and it's UID. Any operations with Indoor Unit referenced by UID (query or change status) are made with Modbus objects from that block. Size of the Modbus objects block for Indoor Unit is 16 adresses. Content of the Modbus objects block is described in CoolMasterNet Tables.
Base Address is calculated as: `Base Address = VA*16 +1`

Below example shows relation between UID, VA, Base Address and Modbus objects

UID	VA	Base Address	Modbus Objects Block			
			Discrete Inputs	Coils	Input Registers	Holding Registers
L1.100	0001	0x0011 --->	0x0011	0x0011	0x0011	0x0011
			...	...	...	...
			0x0020	0x0020	0x0020	0x0020
L1.101	0002	0x0021 --->	0x0021	0x0021	0x0021	0x0021
			...	...	...	...
			0x0030	0x0030	0x0030	0x0030

VA's can be allocated or deallocated (deleted) all together or separately. As shown above for automatic VA's allocation **va auto** command is used. It is possible to allocate VA for specific UID. For example, allocate VA 0004 for UID L1.102:

```
>va + L1.102 0004
OK
```

In this case UID does not have to be detected (visible) by CoolAutomation device at the VA allocation time. It is allowed to allocate a number of VA's for any given UID.

To delete all allocated VA's:

```
>va delall
OK
```

Specific VA can also be deleted (below command will delete VA 0004):

```
>va - 0004
OK
```

Alternatively all VA's associated with specific UID can be deleted (below command will delete all VA's associated with UID L1.102):

```
>va - L1.102
OK
```

Once VA's are allocated Modbus RTU and Modbus IP can be properly used to access Indoor Unit parameters via associated VA's.

3 Modbus Tables

Supported Modbus Exception Codes

Exception Code	Exception Name
0x01 (01)	Illegal Function
0x02 (02)	Illegal Data Address
0x03 (03)	Illegal Data Value
0x04 (04)	Server Device Failure
0x05 (05)	Acknowledgment
0x06 (06)	Server Device Busy
0x0A (10)	Gateway Path Unavailable

3.1 CoolMasterNet Modbus Tables

Supported Modbus functions

Function Code		Function Definition
Dec	Hex	
1	0x01	Read Coils
2	0x02	Read Discrete Inputs
3	0x03	Read Holding Registers
4	0x04	Read Input Register
5	0x05	Write Single Coil
6	0x06	Write Single Register
15	0x0F	Write Single Coil
16	0x10	Write Multiple Registers

Indoor Unit Modbus objects block

Base Address	Holding Registers	Input Registers	Coils	Discrete Inputs
+0	Operation Mode 0-Cool 1-Heat 2-Auto 3-Dry 4-HAUX 5-Fan 6-HH 8-VAM Auto 9-VAM Bypass 10-VAM Heat Exc 11-VAM Normal	UID Ln.XYY Bits 15..12 Ln; Bits 11..8 X; Bits 7..0 YY	On/Off 0-OFF 1-ON	Therm_ON/Demand Status
+1	Fan Speed 0-Low 1-Med 2-High 3-Auto 4-Top 5-Very Lo 7-VAM Super Hi 8-VAM Lo FreshUp 9-VAM Hi FreshUp	Room Temperature x10 °C	Filter Sign	Indoor Communication Failure (Indoor disconnected)
+2	Set Temperature x10 °C	HVAC Malfunction Code String[2] First two characters	External Terminals Status (Read Only) 0-Open, 1-Closed (short)	Reserved
+3	On/Off 0-OFF 1-ON	HVAC Malfunction Code String[2] Last two characters	Inhibit[4]	
+4	Filter Sign	Reserved	Reserved	
+5	Swing 0-Vertical 4-Horizontal 1-30 deg 2-45 deg 3-60 deg 5-Auto 6-OFF			
+6	Room Temperature x10 °C (Read Only[5])			
+7	HVAC Malfunction Code (Read Only)			
+8	Local Wall Controller Lock Bits[3] LSB Bit 0 - Inhibit On/Off control Bit 1 - Inhibit Mode control Bit 2 - Inhibit Set Temperature control Bit 7 - Inhibit All control operations			
+9	Set Temperature Limits[1] v0.4.4		Digital Output 1	Digital Input 1
+10 0xA	Reserved		Digital Output 2	Digital Input 2
+11 0xB			Digital Output 3	Digital Input 3
+12 0xC			Digital Output 4	Digital Input 4
+13 0xD		Analog Input 1	Digital Output 5	Digital Input 5
+14 0xE		Analog Input 2	Digital Output 6	Digital Input 6
+15 0xF		Reserved	Reserved	Reserved

[1] Set Temperature Limits Encoding

MSB Bits 15..8	LSB Bits 7..0
High Limit x2	Low Limit x2

For example, 0x4020 means
High Limit = 0x40/2 = 32(decimal)
Low Limit = 0x20/2 = 16(decimal)
Zero value of High Limit or Low Limit means that corresponding limit is not in use.

2 HVAC Malfunction Code String Encoding

This parameter is a HVAC malfunction code in string format, same as reported by **`ls`** command. Here are some examples:

Malfunction Code	String	Input Register Values
0	"OK␣␣"	0x4F4B, 0x2020
6608	"6608"	0x3636, 0x3038

3 Locks compatibility

Lock type	Compatible HVAC Model	Notes
Inhibit On/Off control	DK, SA, TO, PN	
Inhibit Mode control	DK, SA, TO, PN, MD, TR, KT, CG	v 0.4.9
Inhibit Set Temperature control	DK, SA, TO, PN	
Inhibit All control operations	HT, MD, TR, KT, CG	v 0.4.7

4 Inhibit

Writing this coil activates or deactivates (according to value 1 or 0) inhibit of the indoor unit ON operation. Upon inhibit activation current ON/OFF status of the indoor unit is stored and indoor unit is unconditionally turned OFF after about 8s delay. Indoor unit will be forced OFF until inhibit deactivation. On inhibit deactivation indoor unit will be turned ON if ON status was previously stored at inhibit activation. This function is oriented to work with window sensor to prevent HVAC operation while window is open.

5 Writing Room Temperature Holding Register

For some HVAC models (ME,SI,CH,EL,GRNS) it is possible to write this holding register to suggest room temperature to related indoor unit. This functionality is similar to **`feed`** command described in PRM document.

3.1.1 Special Devices

- PAC YG66

This device supports Digital Inputs 1..6 and Digital Outputs 1..6 accessed via corresponding Coils and Discrete Inputs listed in "**Indoor Unit Modbus objects block**" table.

- PAC YG63

This device supports Analog Inputs 1,2 accessed via corresponding Inputs Registers listed in "**Indoor Unit Modbus objects block**" table. The actual Analog Input value should be calculated as

```
Analog Input Value = Input Register Value / 10
```

For example if temperature sensor is connected to Analog Input 1 of PAC YG63 and Analog Input 1 Input Register is read as 275 the temperature is 275/10 = 27.5

3.2 CooLinkNet Modbus Tables

Supported Modbus functions

Function Code		Function Definition
Dec	Hex	
3	0x03	Read Holding Registers
6	0x06	Write Single Register
16	0x10	Write Multiple Registers

Holding Reg Address*		Description	Read Write	Required**		Notes
Hex	Dec			Version	Model	
CooLinkNet Internals						
0001	1	CooLinkNet Version	R			Major*100 + Minor*10 + SubMinor
0002	2	CooLinkNet S/N	R			Lower 16 bit
0003	3	CooLinkNet Model	R			Two ASCII characters
0004	4	Modbus Address	RW			Modbus Address change is effective only after reset
0005	5	Reset	W			1 - Enter Boot mode CooLinkNet does not respond to the write request to this register 2 - Reset
0010	16	Internal State • 0 - Not Connected to RC line • 1 - Connecting • 2 - Connected as single RC • 3 - Connected as Master RC. Detected Slave RC • 4 - Connected as Slave RC	R			
0011	17	0 - Master Mode (default) 1 - Slave Mode	RW	0.0.4		
0021	33	UID	R			MSB - X, LSB - YY
Indoor Status and Control						
0100	256	On/Off 0-Off, 1-On	RW			
0101	257	Operation Mode 0-Cool 3-Dry 1-Heat 4-HAUX 2-Auto 5-Fan	RW			
0102	258	Fan Speed 0-Low 3-Auto 1-Med 4-Top 2-High	RW			
0103	259	Set Point °C	RW			
0104	260	Failure Code	R			
0105	261	Indoor Ambient Temperature °C	R			MSB - Integer Part LSB - Fraction Part * 0.01
0110	272	Feed Temperature °C	RW	0.2.4		0xFFFF - disable feed

* If Version or Model is not specified, it means that register is supported in any CooLinkNet version and/or model.

3.3 HVAC Malfunction Codes

The value read from "HVAC Malfunction Code" holding register can be translated into native malfunction code applicable for specific HVAC manufacturer. In most cases that value and native code are equal but for some HVAC models translation to alphanumeric representation required. Following tables can be used for such translation.

- Zero value (0x0000) means that there is no HVAC malfunction.
- 0xFFFF hexadecimal (65535 decimal) value indicates that communication with indoor unit was lost.

HVAC Type	Native Malfunction Code Format
DK	XX (see DK type HVAC malfunction codes translation table)
PN, SA, TO	Xnn (see PN, SA, TO type HVAC malfunction codes translation table)
ME	nnnn decimal
GR	HH hexadecimal (low nibble or high nibble)
LG	nn decimal
MG,TR,KT,CG	EH if code == 0x1H PH if code == 0x2H H# if code == 0x3H
SM	nnn decimal
Others	HH hexadecimal

DK type HVAC malfunction codes translation table

```
000 (0x00) - OK    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
```

PN, SA, TO type HVAC malfunction codes translation table

```
000 (0x00) - OK    001 (0x01) - A01   002 (0x02) - A02   003 (0x03) - A03
004 (0x04) - A04   005 (0x05) - A05   006 (0x06) - A06   007 (0x07) - A07
008 (0x08) - A08   009 (0x09) - A09   010 (0x0A) - A10   011 (0x0B) - A11
012 (0x0C) - A12   013 (0x0D) - A13   014 (0x0E) - A14   015 (0x0F) - A15

016 (0x10) - A16   017 (0x11) - A17   018 (0x12) - A18   019 (0x13) - A19
020 (0x14) - A20   021 (0x15) - A21   022 (0x16) - A22   023 (0x17) - A23
024 (0x18) - A24   025 (0x19) - A25   026 (0x1A) - A26   027 (0x1B) - A27
028 (0x1C) - A28   029 (0x1D) - A29   030 (0x1E) - A30   031 (0x1F) - A31

032 (0x20) - C00   033 (0x21) - C01   034 (0x22) - C02   035 (0x23) - C03
036 (0x24) - C04   037 (0x25) - C05   038 (0x26) - C06   039 (0x27) - C07
040 (0x28) - C08   041 (0x29) - C09   042 (0x2A) - C10   043 (0x2B) - C11
044 (0x2C) - C12   045 (0x2D) - C13   046 (0x2E) - C14   047 (0x2F) - C15

048 (0x30) - C16   049 (0x31) - C17   050 (0x32) - C18   051 (0x33) - C19
052 (0x34) - C20   053 (0x35) - C21   054 (0x36) - C22   055 (0x37) - C23
056 (0x38) - C24   057 (0x39) - C25   058 (0x3A) - C26   059 (0x3B) - C27
060 (0x3C) - C28   061 (0x3D) - C29   062 (0x3E) - C30   063 (0x3F) - C31

064 (0x40) - E00   065 (0x41) - E01   066 (0x42) - E02   067 (0x43) - E03
068 (0x44) - E04   069 (0x45) - E05   070 (0x46) - E06   071 (0x47) - E07
072 (0x48) - E08   073 (0x49) - E09   074 (0x4A) - E10   075 (0x4B) - E11
076 (0x4C) - E12   077 (0x4D) - E13   078 (0x4E) - E14   079 (0x4F) - E15

080 (0x50) - E16   081 (0x51) - E17   082 (0x52) - E18   083 (0x53) - E19
084 (0x54) - E20   085 (0x55) - E21   086 (0x56) - E22   087 (0x57) - E23
088 (0x58) - E24   089 (0x59) - E25   090 (0x5A) - E26   091 (0x5B) - E27
092 (0x5C) - E28   093 (0x5D) - E29   094 (0x5E) - E30   095 (0x5F) - E31

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) - H00   129 (0x81) - H01   130 (0x82) - H02   131 (0x83) - H03
132 (0x84) - H04   133 (0x85) - H05   134 (0x86) - H06   135 (0x87) - H07
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136 (0x88) - H08	137 (0x89) - H09	138 (0x8A) - H10	139 (0x8B) - H11
140 (0x8C) - H12	141 (0x8D) - H13	142 (0x8E) - H14	143 (0x8F) - H15
144 (0x90) - H16	145 (0x91) - H17	146 (0x92) - H18	147 (0x93) - H19
148 (0x94) - H20	149 (0x95) - H21	150 (0x96) - H22	151 (0x97) - H23
152 (0x98) - H24	153 (0x99) - H25	154 (0x9A) - H26	155 (0x9B) - H27
156 (0x9C) - H28	157 (0x9D) - H29	158 (0x9E) - H30	159 (0x9F) - H31
160 (0xA0) - J00	161 (0xA1) - J01	162 (0xA2) - J02	163 (0xA3) - J03
164 (0xA4) - J04	165 (0xA5) - J05	166 (0xA6) - J06	167 (0xA7) - J07
168 (0xA8) - J08	169 (0xA9) - J09	170 (0xAA) - J10	171 (0xAB) - J11
172 (0xAC) - J12	173 (0xAD) - J13	174 (0xAE) - J14	175 (0xAF) - J15
176 (0xB0) - J16	177 (0xB1) - J17	178 (0xB2) - J18	179 (0xB3) - J19
180 (0xB4) - J20	181 (0xB5) - J21	182 (0xB6) - J22	183 (0xB7) - J23
184 (0xB8) - J24	185 (0xB9) - J25	186 (0xBA) - J26	187 (0xBB) - J27
188 (0xBC) - J28	189 (0xBD) - J29	190 (0xBE) - J30	191 (0xBF) - J31
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

4 PRO Functionality

- PRO Indoor Units Base Address calculation:
  `Base Address = VA * 16 +1`

- PRO Outdoor Systems and Outdoor Units Base Address calculation:
  `Base Address = 16401 + ((VA-1025) * 64)`

4.1 PRO Modbus Tables

Supported Modbus functions

Function Code		Function Definition
Dec	**Hex**	
4	0x04	Read Input Register

4.1.1 DK

4.1.1.1 DK PRO Indoor Units

Base Address	Input Registers	
	Short Name	**Description**
+1	Suction T°	Suction Temperature x10 °C
+2	Liquid T°	Liquid Pipe Temperature x10 °C
+3	Gas Pipe T°	Gas Pipe Temperature x10 °C
+4	EV Opening	EV Opening
+5		HVAC Malfunction Code
+6		Set Temperature °C
+7	Onoff TstatOn	**Bitfields:** LSB Bit 0 - 0-OFF, 1-ON Bit 1 - Thermostat_ON (demand)
+8	AirNet Addr.	Airnet Address

4.1.1.2 DK PRO Outdoor Systems

- **VRV4S1, VRV4S2, mini-VRV, VRV-3S, VRV4S-US(RXTQ), VRV-M, VRV-3P**

Base Address	Input Registers	
	Short Name	**Description**
+0	Type	Type Code = 8 - VRV4S1 Type Code = 9 - VRV4S2 Type Code = 13 - mini-VRV Type Code = 4 - VRV-3S Type Code = 14 - VRV4S-US(RXTQ) Type Code = 11 - VRV-M Type Code = 1 - VRV-3P
+1	AirNet	AirNet Addr.
+2	SysHP	System HP [hp]

Base Address	Input Registers	
	Short Name	Description
+3	SysCur	System Current x 0.1 [A]
+4	TrgtEvT	Target Evaporation T x 0.1 [°C]
+5	TrgtCndT	Target Condensing T [°C]
+6	ErrCode	Error code
+7	 Cool Heat Vent TstatOn ResrtStby BkpOp	**Bitfields:** Bit 0 - Cooling Bit 1 - Heating Bit 2 - Ventilation Bit 3 - Thermostat ON Bit 4 - Restart stand-by Bit 7 - Backup ope.
+8	DmndState	Demand state

- **VRV4S3, VRVX, VRV4-EU**

Base Address	Input Registers	
	Short Name	Description
+0	Type	Type Code = 10 - VRV4S3 Type Code = 6 - VRVX Type Code = 7 - VRV4-EU
+1	AirNet	AirNet Addr.
+2	SysHP	System HP [hp]
+3	SysCur	System Current x 0.1 [A]
+4	TrgtEvT	Target Evaporation T x 0.1 [°C]
+5	TrgtCndT	Target Condensing T [°C]
+6	ErrCode	Error code
+7	 Cool Heat Vent TstatOn ResrtStby Dfrst StrtupCtl BkpOp OiRtrn	**Bitfields:** Bit 0 - Cooling Bit 1 - Heating Bit 2 - Ventilation Bit 3 - Thermostat ON Bit 4 - Restart stand-by Bit 5 - Defrost Bit 6 - Startup control Bit 7 - Backup ope. Bit 9 - Oil return
+8	DmndState	Demand state
+9	OpCtlMod	Operation control mode
+10	TstatOnCap	I/U thermostat ON capacity

- **VRV-M(REYQ8-48M)**

Base Address	Input Registers	
	Short Name	Description
+0	Type	Type Code = 12 - VRV-M(REYQ8-48M)
+1	AirNet	AirNet Addr.
+2	SysHP	System HP [hp]
+3	SysCur	System Current x 0.1 [A]
+4	TrgtEvT	Target Evaporation T x 0.1 [°C]

Base Address	Input Registers	
	Short Name	Description
+5	TrgtCndT	Target Condensing T [°C]
+6	ErrCode	Error code
+7	 Cool Heat Vent TstatOn ResrtStby BkpOp CoolHeatPrll	**Bitfields:** Bit 0 - Cooling Bit 1 - Heating Bit 2 - Ventilation Bit 3 - Thermostat ON Bit 4 - Restart stand-by Bit 7 - Backup ope. Bit 8 - Cool/Heat parallel ope.
+8	DmndState	Demand state

- **VRV4-us(RELQ,RXLQ), VRV-4R**

Base Address	Input Registers	
	Short Name	Description
+0	Type	Type Code = 15 - VRV4-us(RELQ,RXLQ) Type Code = 3 - VRV-4R
+1	AirNet	AirNet Addr.
+2	SysHP	System HP [hp]
+3	SysCur	System Current x 0.1 [A]
+4	TrgtEvT	Target Evaporation T x 0.1 [°C]
+5	TrgtCndT	Target Condensing T [°C]
+6	ErrCode	Error code
+7	 Cool Heat Vent TstatOn ResrtStby Dfrst StrtupCtl BkpOp CoolHeatPrll OiRtrn	**Bitfields:** Bit 0 - Cooling Bit 1 - Heating Bit 2 - Ventilation Bit 3 - Thermostat ON Bit 4 - Restart stand-by Bit 5 - Defrost Bit 6 - Startup control Bit 7 - Backup ope. Bit 8 - Cool/Heat parallel ope. Bit 9 - Oil return
+8	DmndState	Demand state
+9	OpCtlMod	Operation control mode
+10	TstatOnCap	I/U thermostat ON capacity

- **VRV-3R, VRV3C**

Base Address	Input Registers	
	Short Name	Description
+0	Type	Type Code = 5 - VRV-3R Type Code = 2 - VRV3C
+1	AirNet	AirNet Addr.
+2	SysHP	System HP [hp]
+3	SysCur	System Current x 0.1 [A]
+4	TrgtEvT	Target Evaporation T x 0.1 [°C]
+5	TrgtCndT	Target Condensing T [°C]

Base Address	Input Registers	
	Short Name	Description
+6	ErrCode	Error code
+7	 Cool Heat Vent TstatOn ResrtStby BkpOp CoolHeatPrll	**Bitfields:** Bit 0 - Cooling Bit 1 - Heating Bit 2 - Ventilation Bit 3 - Thermostat ON Bit 4 - Restart stand-by Bit 7 - Backup ope. Bit 8 - Cool/Heat parallel ope.
+8	DmndState	Demand state

4.1.1.3 DK PRO Outdoor Units

- **VRV4S1, VRV4S2, VRV-3S, VRV4S-US(RXTQ), VRV-3P**

Base Address	Input Registers	
	Short Name	Description
+1	AirNet	AirNet Addr.
+2	HP	HP [hp]
+3	AmbT	Ambient temperature [°C]
+4	SuctT	Suction Temperature [°C]
+5	EvT	Evaporating Temperature [°C]
+6	CndT	Condensing Temperature [°C]
+7	InvRS	Inverter Revolution Speed [rps]
+8	EVOp1	EV opening 1 [pls]
+9	EVOp2	EV opening 2 [pls]
+12	CTSTD1	CT1 (STD1) [A]
+13	CTSTD2	CT2 (STD2) [A]
+14	FanStp	Fan step
+15	CilT	R4T :Coil temp. [°C]
+16	ScCilExtT	Subcooling Coil exit Temp. [°C]
+17	DschTInv	Disch. temp.(INV) [°C]
+18	DschTStd1	Disch. temp.(STD1) [°C]
+19	DschTStd2	Disch. temp.(STD2) [°C]
+20	AccEntrT	Accumulator Entrance Temp. [°C]
+21	RcvrLiqT	Receiver Liquid Temp. [°C]
+22	InvT	Inverter temp. [°C]
+23	InvCur	Inverter current [A]
+24	InvFanCur	INV FAN current [A]
+25	 Comp1Inv Comp2Std1 Comp3Std2 OiRtrn HotGas CcH1 CcH2 CcH3	**Bitfields:** Bit 0 - Compressor1(INV) Bit 1 - Compressor2(STD1) Bit 2 - Compressor3(STD2) Bit 3 - Oil return Bit 4 - Hot Gas Bit 5 - CH1:Crankcase Heater Bit 6 - CH2:Crankcase Heater Bit 7 - CH3:Crankcase Heater

Base Address	Input Registers	
	Short Name	**Description**
	SoftStrt	Bit 8 - Soft start
	ResrtStby	Bit 9 - Restart stand-by
	MulOi	Bit 10 - Multi oil
	ErrState	Bit 11 - Unit Error stat
	EnrgyCutOutp	Bit 12 - Energy cut output
	HiPRtry	Bit 13 - High pressure retry
	LoPRtry	Bit 14 - Low pressure retry
	DischPipRtry	Bit 15 - Disch. pipe retry
+26		**Bitfields:**
	4WayVlv	Bit 0 - 4 way valve
	Injct	Bit 2 - Injection
	Dfrst	Bit 3 - Defrost
	HiPStpDnCtl	Bit 4 - H.P. stepping down cntl
	LoPStpDnCtl	Bit 5 - L.P. stepping down cntl
	DmndStpDnCtl	Bit 6 - Demand stepping down cntl
	InvRtry	Bit 7 - INV retry
	InvDschStpDnCtl	Bit 8 - INV Disch. stepping down cntl
	InvOCStpDnCtl	Bit 9 - INV OC stepping down cntl
	InvFinStpDnCtl	Bit 10 - INV Fin stepping down cntl
	Std1DschStpDnCtl	Bit 11 - STD1 Disch. stepping down cntl
	Std1OCStpDnCtl	Bit 12 - STD1 OC stepping down cntl
	Std2DschStpDnCtl	Bit 13 - STD2 Disch. stepping down cntl
	Std2OCStpDnCtl	Bit 14 - STD2 OC stepping down cntl

- **VRV4S3, VRVX, VRV4-EU**

Base Address	Input Registers	
	Short Name	**Description**
+1	AirNet	AirNet Addr.
+2	HP	HP [hp]
+3	Inv1RotAmnt	INV 1 rotation amount [rps]
+4	Inv2RotAmnt	INV 2 rotation amount [rps]
+5	Fan1RotAmnt	Fan 1 rotation amount [rpm]
+6	Fan2RotAmnt	Fan 2 rotation amount [rpm]
+7	FanStp	Fan step
+8	EVOp1	EV opening 1 [pls]
+9	EVOp2	EV opening 2 [pls]
+10	EVOp3	EV opening 3 [pls]
+14		**Bitfields:**
	CompInv1	Bit 0 - Compressor 1(INV1)
	CompInv2	Bit 1 - Compressor 2(INV2)
	CcH1	Bit 2 - CH1:Crankcase Heater
	CcH2	Bit 3 - CH2:Crankcase Heater
	4WayVlv	Bit 4 - 4 way valve
	OiRtrn1	Bit 5 - Oil return 1
	AccOiRtrn	Bit 6 - Accumulator oil return
	OiRtrn2	Bit 7 - Oil return 2
	4WayVlvHeat	Bit 8 - 4 way valve(Heating)
	ErrState	Bit 9 - Unit Error stat
	DrnPanHtr	Bit 13 - Drain pan heater
	EnrgyCutOutp	Bit 14 - Energy cut output

Base Address	Input Registers	
	Short Name	Description
+15		**Bitfields:**
	HiPRtry	Bit 0 - High pressure retry
	LoPRtry	Bit 1 - Low pressure retry
	DischPipRtry	Bit 2 - Disch. pipe retry
	OHStby	Bit 3 - Overheating stand-by
	Inv1Stby	Bit 4 - INV1 stand-by
	Inv2Stby	Bit 5 - INV2 stand-by
	HiPStpDnCtl	Bit 6 - H.P. stepping down cntl
	LoPStpDnCtl	Bit 7 - L.P. stepping down cntl
	DmndStpDnCtl	Bit 8 - Demand stepping down cntl
	Comp1DschStpDnCtl	Bit 9 - Comp.1 Disch. stepping down cntl
	Comp2DschStpDnCtl	Bit 10 - Comp.2 Disch. stepping down cntl
	Comp1OCStpDnCtl	Bit 11 - Comp.1 OC stepping down cntl
	Comp2OCStpDnCtl	Bit 12 - Comp.2 OC stepping down cntl
	Inv1FinStpDnCtl	Bit 13 - INV1 Fin stepping down cntl
	Inv2FinStpDnCtl	Bit 14 - INV2 Fin stepping down cntl

- **VRV4S3, VRVX, VRV4-EU**

Base Address	Input Registers	
	Short Name	Description
+1	AirNet	AirNet Addr.
+2	AmbT	Ambient temperature [°C]
+3	DschTComp1	Discharge pipe temp.(Comp.1) [°C]
+4	DschTComp2	Discharge pipe temp.(Comp.2) [°C]
+5	EvT	Evaporating Temperature [°C]
+6	CndT	Condensing Temperature [°C]
+7	HexT	Heat exchanger temp. [°C]
+8	HexLiqT	Heat exchanger liquid pipe temp. [°C]
+13	ScHexGasT	Subcooling heat exchanger gas temp. [°C]
+14	ScHexLiqT	Subcooling heat exchanger liquid temp. [°C]
+17	CompSrfT	Compressor surface temp. [°C]
+18	AccInltT	Accumulator inlet temp. [°C]
+21	Comp1Cur	Comp.1 current [A]
+22	Comp2Cur	Comp.2 current [A]
+23	Inv1FinT	INV1 fin temp. [°C]
+24	Inv2FinT	INV2 fin temp. [°C]
+25	InvFanCur	INV FAN current [A]

- **mini-VRV, VRV-M**

Base Address	Input Registers	
	Short Name	Description
+1	AirNet	AirNet Addr.
+2	HP	HP [hp]
+3	AmbT	Ambient temperature [°C]
+4	SuctT	Suction Temperature [°C]
+5	EvT	Evaporating Temperature [°C]
+6	CndT	Condensing Temperature [°C]

Base Address	Input Registers	
	Short Name	Description
+8	EVOp1	EV opening 1 [pls]
+9	EVOp2	EV opening 2 [pls]
+12	CTSTD1	CT1 (STD1) [A]
+13	CTSTD2	CT2 (STD2) [A]
+14	FanStp	Fan step
+15	CilT	R4T :Coil temp. [°C]
+16	ScCilExtT	Subcooling Coil exit Temp. [°C]
+17	DschTInv	Disch. temp.(INV) [°C]
+18	DschTStd1	Disch. temp.(STD1) [°C]
+19	DschTStd2	Disch. temp.(STD2) [°C]
+21	RcvrLiqT	Receiver Liquid Temp. [°C]
+22	InvT	Inverter temp. [°C]
+23	InvCur	Inverter current [A]
+24	InvFanCur	INV FAN current [A]
+25	Comp1Inv Comp2Std1 Comp3Std2 OiRtrn HotGas CcH1 CcH2 CcH3 SoftStrt ResrtStby MulOi ErrState EnrgyCutOutp HiPRtry LoPRtry DischPipRtry	**Bitfields:** Bit 0 - Compressor1(INV) Bit 1 - Compressor2(STD1) Bit 2 - Compressor3(STD2) Bit 3 - Oil return Bit 4 - Hot Gas Bit 5 - CH1:Crankcase Heater Bit 6 - CH2:Crankcase Heater Bit 7 - CH3:Crankcase Heater Bit 8 - Soft start Bit 9 - Restart stand-by Bit 10 - Multi oil Bit 11 - Unit Error stat Bit 12 - Energy cut output Bit 13 - High pressure retry Bit 14 - Low pressure retry Bit 15 - Disch. pipe retry
+26	4WayVlv Injct Dfrst HiPDroCtl LoPDroCtl InvDschDroCtl InvCurDroCtl InvFinDroCtl Std1DschDroCtl Std1OCDroCtl Std2DschDroCtl Std2OCDroCtl	**Bitfields:** Bit 0 - 4 way valve Bit 2 - Injection Bit 3 - Defrost Bit 4 - High pres. drooping cntl. Bit 5 - Low pres. drooping cntl. Bit 8 - INV Disch. pipe drooping cntl. Bit 9 - INV current drooping cntl. Bit 10 - INV fin drooping cntl. Bit 11 - INV fin drooping cntl. Bit 12 - INV fin drooping cntl. Bit 13 - INV fin drooping cntl. Bit 14 - INV fin drooping cntl.
+27	InvStby RcvrGasIn RcvrGasOut StpUnGasOut StpUnLiqPipCls	**Bitfields:** Bit 5 - INV stand-by Bit 6 - SVL:Receiver gas in Bit 7 - SVG:Receiver gas out Bit 8 - SVSG:StopUnit Gas out Bit 9 - SVSL:StopUnit Liquid pipe close

Base Address	Input Registers	
	Short Name	Description
+35	OiPEqT	Oil Pres. equalizer Temp. [°C]
+36	InvFrq	Inverter frequency [Hz]

- **VRV-M(REYQ8-48M)**

Base Address	Input Registers	
	Short Name	Description
+1	AirNet	AirNet Addr.
+2	HP	HP [hp]
+3	AmbT	Ambient temperature [°C]
+4	SuctT	Suction Temperature [°C]
+5	EvT	Evaporating Temperature [°C]
+6	CndT	Condensing Temperature [°C]
+8	EVOp1	EV opening 1 [pls]
+9	EVOp2	EV opening 2 [pls]
+10	EVOp3	EV opening 3 [pls]
+12	CTSTD1	CT1 (STD1) [A]
+13	CTSTD2	CT2 (STD2) [A]
+14	FanStp	Fan step
+15	CilT	R4T :Coil temp. [°C]
+16	ScCilExtT	Subcooling Coil exit Temp. [°C]
+17	DschTInv	Disch. temp.(INV) [°C]
+18	DschTStd1	Disch. temp.(STD1) [°C]
+19	DschTStd2	Disch. temp.(STD2) [°C]
+21	RcvrLiqT	Receiver Liquid Temp. [°C]
+22	InvT	Inverter temp. [°C]
+23	InvCur	Inverter current [A]
+24	InvFanCur	INV FAN current [A]
+25	Comp1Inv Comp2Std1 Comp3Std2 OiRtrn HotGas CcH1 CcH2 CcH3 SoftStrt ResrtStby MulOi ErrState EnrgyCutOutp HiPRtry LoPRtry DischPipRtry	**Bitfields:** Bit 0 - Compressor1(INV) Bit 1 - Compressor2(STD1) Bit 2 - Compressor3(STD2) Bit 3 - Oil return Bit 4 - Hot Gas Bit 5 - CH1:Crankcase Heater Bit 6 - CH2:Crankcase Heater Bit 7 - CH3:Crankcase Heater Bit 8 - Soft start Bit 9 - Restart stand-by Bit 10 - Multi oil Bit 11 - Unit Error stat Bit 12 - Energy cut output Bit 13 - High pressure retry Bit 14 - Low pressure retry Bit 15 - Disch. pipe retry
+26	4WayVlv1 4WayVlv2 Dfrst	**Bitfields:** Bit 0 - 4-way valve 1 Bit 1 - 4-way valve 2 Bit 3 - Defrost

Base Address	Input Registers	
	Short Name	Description
	HiPDroCtl	Bit 4 - High pres. drooping cntl.
	LoPDroCtl	Bit 5 - Low pres. drooping cntl.
	InvDschDroCtl	Bit 8 - INV Disch. pipe drooping cntl.
	InvCurDroCtl	Bit 9 - INV current drooping cntl.
	InvFinDroCtl	Bit 10 - INV fin drooping cntl.
	Std1DschDroCtl	Bit 11 - INV fin drooping cntl.
	Std1OCDroCtl	Bit 12 - INV fin drooping cntl.
	Std2DschDroCtl	Bit 13 - INV fin drooping cntl.
	Std2OCDroCtl	Bit 14 - INV fin drooping cntl.
+27		**Bitfields:**
	InvStby	Bit 5 - INV stand-by
	RcvrGasIn	Bit 6 - SVL:Receiver gas in
	RcvrGasOut	Bit 7 - SVG:Receiver gas out
	StpUnGasOut	Bit 8 - SVSG:StopUnit Gas out
	StpUnLiqPipCls	Bit 9 - SVSL:StopUnit Liquid pipe close
	HiPRduVlv	Bit 10 - Y7S:High pressure reducing valve
+35	OiPEqT	Oil Pres. equalizer Temp. [°C]
+36	InvFrq	Inverter frequency [Hz]
+37	CilGas1T	R81T:Coil gas 1 temp. [°C]
+38	CilGas2T	R81T:Coil gas 2 temp. [°C]

- **VRV4-us(RELQ,RXLQ), VRV-4R**

Base Address	Input Registers	
	Short Name	Description
+1	AirNet	AirNet Addr.
+2	HP	HP [hp]
+3	Inv1RotAmnt	INV 1 rotation amount [rps]
+4	Inv2RotAmnt	INV 2 rotation amount [rps]
+5	Fan1RotAmnt	Fan 1 rotation amount [rpm]
+6	Fan2RotAmnt	Fan 2 rotation amount [rpm]
+7	FanStp	Fan step
+8	EVOp1	EV opening 1 [pls]
+9	EVOp2	EV opening 2 [pls]
+10	EVOp3	EV opening 3 [pls]
+11	EVOp4	EV4 pls.(receiver gas purge) [pls]
+12	EVOp5	EV5 pls.(cooling refrigant) [pls]
+13	EVOp6	EV6 pls.(leak detection) [pls]
+14		**Bitfields:**
	CompInv1	Bit 0 - Compressor 1(INV1)
	CompInv2	Bit 1 - Compressor 2(INV2)
	CcH1	Bit 2 - CH1:Crankcase Heater
	CcH2	Bit 3 - CH2:Crankcase Heater
	4WayVlv	Bit 4 - 4 way valve
	OiRtrn1	Bit 5 - Oil return 1
	OiRtrn2	Bit 7 - Oil return 2
	ErrState	Bit 9 - Unit Error stat
	4WayVlvUpr	Bit 10 - 4-way valve(upper heat exchanger)
	4WayVlvUndr	Bit 11 - 4-way valve(under heat exchanger)
	SolVlv	Bit 12 - Sol. valve(shutoff liquid pipe)

Base Address	Input Registers	
	Short Name	Description
	DrnPanHtr	Bit 13 - Drain pan heater
	EnrgyCutOutp	Bit 14 - Energy cut output
+15		**Bitfields:**
	HiPRtry	Bit 0 - High pressure retry
	LoPRtry	Bit 1 - Low pressure retry
	DischPipRtry	Bit 2 - Disch. pipe retry
	OHStby	Bit 3 - Overheating stand-by
	Inv1Stby	Bit 4 - INV1 stand-by
	Inv2Stby	Bit 5 - INV2 stand-by
	HiPStpDnCtl	Bit 6 - H.P. stepping down cntl
	LoPStpDnCtl	Bit 7 - L.P. stepping down cntl
	DmndStpDnCtl	Bit 8 - Demand stepping down cntl
	Comp1DschStpDnCtl	Bit 9 - Comp.1 Disch. stepping down cntl
	Comp2DschStpDnCtl	Bit 10 - Comp.2 Disch. stepping down cntl
	Comp1OCStpDnCtl	Bit 11 - Comp.1 OC stepping down cntl
	Comp2OCStpDnCtl	Bit 12 - Comp.2 OC stepping down cntl
	Inv1FinStpDnCtl	Bit 13 - INV1 Fin stepping down cntl
	Inv2FinStpDnCtl	Bit 14 - INV2 Fin stepping down cntl

- **VRV4-us(RELQ,RXLQ), VRV-4R**

Base Address	Input Registers	
	Short Name	Description
+1	AirNet	AirNet Addr.
+2	AmbT	Ambient temperature [°C]
+3	DschTComp1	Discharge pipe temp.(Comp.1) [°C]
+4	DschTComp2	Discharge pipe temp.(Comp.2) [°C]
+5	EvT	Evaporating Temperature [°C]
+6	CndT	Condensing Temperature [°C]
+7	HexT	Heat exchanger temp. [°C]
+8	HexLiqT	Heat exchanger liquid pipe temp. [°C]
+9	HexGasTUpr	Heat exchanger gas pipe temp.(upper) [°C]
+10	HexGasTLo	Heat exchanger gas pipe temp.(low) [°C]
+11	HexLiqTUpr	Heat exchanger liquid pipe temp.(upper) [°C]
+12	HexLiqTLo	Heat exchanger liquid pipe temp.(low) [°C]
+13	ScHexGasT	Subcooling heat exchanger gas temp. [°C]
+14	ScHexLiqT	Subcooling heat exchanger liquid temp. [°C]
+15	SuctT	Suction Temperature [°C]
+16	CompSuctPipT	Comp. suction pipe temp. [°C]
+17	CompSrfT	Compressor surface temp. [°C]
+19	RcvrInltT	Receiver inlet temp. [°C]
+20	RcvrGasPrgT	Receiver gas purge temp. [°C]
+21	Comp1Cur	Comp.1 current [A]
+22	Comp2Cur	Comp.2 current [A]
+23	Inv1FinT	INV1 fin temp. [°C]
+24	Inv2FinT	INV2 fin temp. [°C]
+25	InvFanCur	INV FAN current [A]

- **VRV-3R, VRV3C**

Base Address	Input Registers	
	Short Name	Description
+1	AirNet	AirNet Addr.
+2	HP	HP [hp]
+3	AmbT	Ambient temperature [°C]
+4	SuctT	Suction Temperature [°C]
+5	EvT	Evaporating Temperature [°C]
+6	CndT	Condensing Temperature [°C]
+7	InvRS	Inverter Revolution Speed [rps]
+8	EVOp1	EV opening 1 [pls]
+9	EVOp2	EV opening 2 [pls]
+11	EVOp	EV opening [pls]
+12	CTSTD1	CT1 (STD1) [A]
+13	CTSTD2	CT2 (STD2) [A]
+14	FanStp	Fan step
+17	DschTInv	Disch. temp.(INV) [°C]
+18	DschTStd1	Disch. temp.(STD1) [°C]
+19	DschTStd2	Disch. temp.(STD2) [°C]
+22	InvT	Inverter temp. [°C]
+23	InvCur	Inverter current [A]
+24	InvFanCur	INV FAN current [A]
+25	 Comp1Inv Comp2Std1 Comp3Std2 OiRtrn HotGas CcH1 CcH2 CcH3 SoftStrt ResrtStby ErrState EnrgyCutOutp HiPRtry LoPRtry DischPipRtry	**Bitfields:** Bit 0 - Compressor1(INV) Bit 1 - Compressor2(STD1) Bit 2 - Compressor3(STD2) Bit 3 - Oil return Bit 4 - Hot Gas Bit 5 - CH1:Crankcase Heater Bit 6 - CH2:Crankcase Heater Bit 7 - CH3:Crankcase Heater Bit 8 - Soft start Bit 9 - Restart stand-by Bit 11 - Unit Error stat Bit 12 - Energy cut output Bit 13 - High pressure retry Bit 14 - Low pressure retry Bit 15 - Disch. pipe retry
+26	 4WayVlv 4WayVlv2 Dfrst HiPStpDnCtl LoPStpDnCtl DmndStpDnCtl InvRtry InvDschStpDnCtl InvOCStpDnCtl InvFinStpDnCtl Std1DschStpDnCtl Std1OCStpDnCtl Std2DschStpDnCtl Std2OCStpDnCtl	**Bitfields:** Bit 0 - 4 way valve Bit 1 - 4-way valve 2 Bit 3 - Defrost Bit 4 - H.P. stepping down cntl Bit 5 - L.P. stepping down cntl Bit 6 - Demand stepping down cntl Bit 7 - INV retry Bit 8 - INV Disch. stepping down cntl Bit 9 - INV OC stepping down cntl Bit 10 - INV Fin stepping down cntl Bit 11 - STD1 Disch. stepping down cntl Bit 12 - STD1 OC stepping down cntl Bit 13 - STD2 Disch. stepping down cntl Bit 14 - STD2 OC stepping down cntl

Base Address	Input Registers	
	Short Name	Description
	EVByp	Bit 15 - EV bypass
+27	RfrgGasPrg RfrgLiq RfrgDsching RfrgDsch OpOutp	**Bitfields:** Bit 0 - Refrigerant regu. gas purging Bit 1 - Refrigerant regu. liquid Bit 2 - Refrigerant regu. discharging Bit 3 - Refrigerant regu. discharge Bit 4 - Operation output
+29	HexT	Heat exchanger temp. [°C]
+30	HexGasT	Heat Ex. Gas temp. [°C]
+31	HexLiqT	Heat exchanger liquid pipe temp. [°C]
+32	ScHexGasT	Subcooling heat exchanger gas temp. [°C]
+33	ScHexLiqT	Subcooling heat exchanger liquid temp. [°C]
+34	EVLiqT	EV liquid pipe temp. [°C]

4.1.2 ME

4.1.2.1 ME PRO Indoor Units

- **LOSSNEY**

Base Address	Input Registers	
	Short Name	Description
+1	Type Code = **0x8011**	Type Code
+2	TH1	Room Thermistor
+3	TH2	Liquid Pipe Thermistor
+4	SA	Supply Air
+5		
+6	EA	Exhaust Air

- **F/P**

Base Address	Input Registers	
	Short Name	Description
+1	Type Code = **0x80FF**	Type Code
+2	TH1	Room Thermistor
+3	TH2	Liquid Pipe Thermistor
+4	TH3	Gas Pipe Thermistor
+5		
+6	SH	Super Heat
+6	SC	Super Cool
+7	Li	LEV opening pulse

- **PUHZ**

Base Address	Input Registers	
	Short Name	Description
+1	Type Code = **0x800C**	Type Code
+2	TH1	Room Thermistor

Base Address	Input Registers	
	Short Name	Description
+3	TH2	Liquid Pipe Thermistor
+4	TH3	Gas Pipe Thermistor
+5	TH4	Thermistor 4
+6	TH5	Thermistor 5
+7	TH6	Thermistor 6
+8	TH7	Thermistor 7
+9	TH8	Thermistor 8
+10	FAN	Fan capacity
+11	HZ	Frequency
+12	SC	Super Cool
+13	LevA	LEV pulse of indoor unit
+14	LevB	LEV pulse of indoor unit

4.1.2.2 ME PRO Outdoor Units

- **PUMY-P100-140Y/VHM/36-48NHMU**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 1	
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+8	TH8	Thermistor 8 x 0.1 [°C]
+13	63HS	High pressure sensor x 0.1 [kg/cm2]
+20	Vdc	COMP bus voltage x 0.1 [V]
+21	Ii	Input Current x 0.1 [A]
+22	Ic	Compressor Current x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+28	Pdm	Target high pressure x 0.1
+29	ETm	Target Evaporation Temperature x 0.1 [°C]
+32	SC	Sub Cool x 0.1
+33	SCm	Target Sub Cool x 0.1
+37	LEV1	Linear expansion valve
+38	LEV2	Linear expansion valve
+39	LEV3	LEV3 Pulse [pls]
+40	LEV4	Linear expansion valve

- **PUMY-P*V/Y/NH/KM(BR4/UR4/SR1/C-C/-A)**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 7	
+2	TH2	Thermistor 2 x 0.1 [°C]

Base Address	Input Registers	
	Short Name	Description
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+8	TH8	Thermistor 8 x 0.1 [°C]
+13	63HS	High pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+20	Vdc	COMP bus voltage x 0.1 [V]
+21	Ii	Input Current x 0.1 [A]
+22	Ic	Compressor Current x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+28	Pdm	Target high pressure x 0.1
+29	ETm	Target Evaporation Temperature x 0.1 [°C]
+32	SC	Sub Cool x 0.1
+33	SCm	Target Sub Cool x 0.1
+37	LEV1	Linear expansion valve
+38	LEV2	Linear expansion valve
+39	LEV3	LEV3 Pulse [pls]
+40	LEV4	Linear expansion valve

- **PURY-P [capacity], PUHY-P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 9 Type Code = 10	
+1	TH1	Thermistor 1 x 0.1 [°C]
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+8	TH8	Thermistor 8 x 0.1 [°C]
+9	TH9	Thermistor 9 x 0.1 [°C]
+10	TH10	Thermistor 10 x 0.1 [°C]
+12	TH12	Thermistor 12 x 0.1 [°C]
+13	63HS	High pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+17	THBOX	Thermistor in box x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]

Base Address	Input Registers	
	Short Name	Description
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]

- **PURY-P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 20	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+9	TH9	Thermistor 9 x 0.1 [°C]
+10	TH10	Thermistor 10 x 0.1 [°C]
+11	TH11	Thermistor 11 x 0.1 [°C]
+12	TH12	Thermistor 12 x 0.1 [°C]
+13	63HS	High pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat

- **PURY-(E)P [capacity], PURY-(W) [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 22 Type Code = 13	
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]

Base Address	Input Registers	
	Short Name	Description
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+27	Foc	Temporary frequency [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat

- **PURY-(E)P [capacity], PURY-(E) [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 23 Type Code = 14	
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat

- **PURY-P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 8	
+1	TH1	Thermistor 1 x 0.1 [°C]
+2	TH2	Thermistor 2 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+13	63HS	High pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]

Base Address	Input Registers	
	Short Name	Description
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat

- **PURY-P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 3	
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+11	TH11	Thermistor 11 x 0.1 [°C]
+13	63HS	High pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]

- **PURY-P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 2	
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+11	TH11	Thermistor 11 x 0.1 [°C]
+12	TH12	Thermistor 12 x 0.1 [°C]
+13	63HS	High pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]

Base Address	Input Registers	
	Short Name	Description
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]

- **PURY-P [capacity] (T/Y)LMU**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 24	
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+27	Foc	Temporary frequency [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat

- **PURY-P [capacity] YLM-A**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 12	
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+9	TH9	Thermistor 9 x 0.1 [°C]
+11	TH11	Thermistor 11 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]

Base Address	Input Registers	
	Short Name	Description
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+27	Foc	Temporary frequency [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat

- **PUHY-EP [capacity] YLM-A, PUHY-P [capacity] YKB**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 28 Type Code = 19	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+9	TH9	Thermistor 9 x 0.1 [°C]
+11	TH11	Thermistor 11 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+14	63HS2	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+27	Foc	Temporary frequency [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]
+37	LEV1	Linear expansion valve

- **PUHY-EP [capacity] YLM-A**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 29	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+9	TH9	Thermistor 9 x 0.1 [°C]
+11	TH11	Thermistor 11 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+14	63HS2	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]
+37	LEV1	Linear expansion valve

- **PUHY-P [capacity] YNW-A, PUHY-P [capacity] YNW-A**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 25 Type Code = 26	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+9	TH9	Thermistor 9 x 0.1 [°C]
+11	TH11	Thermistor 11 x 0.1 [°C]
+12	TH12	Thermistor 12 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+14	63HS2	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]

Base Address	Input Registers	
	Short Name	Description
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+27	Foc	Temporary frequency [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]
+37	LEV1	Linear expansion valve

- **PUHY-P [capacity] YNW-A**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 27	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+9	TH9	Thermistor 9 x 0.1 [°C]
+11	TH11	Thermistor 11 x 0.1 [°C]
+12	TH12	Thermistor 12 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+14	63HS2	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]
+37	LEV1	Linear expansion valve

- **PUHY-(E)P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 5	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]
+26	FAN	Fan output [Hz]
+27	Foc	Temporary frequency [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]

- **PUHY-(E)P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 17	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+17	THBOX	Thermistor in box x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+25	F(Hz)	All temporary frequencies [Hz]

Base Address	Input Registers	
	Short Name	Description
+26	FAN	Fan output [Hz]
+27	Foc	Temporary frequency [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]
+37	LEV1	Linear expansion valve
+38	LEV2	Linear expansion valve

- **PUHY-(E)P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 6	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]

- **PUHY-(E)P [capacity]**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 18	
+2	TH2	Thermistor 2 x 0.1 [°C]
+3	TH3	Thermistor 3 x 0.1 [°C]
+4	TH4	Thermistor 4 x 0.1 [°C]
+5	TH5	Thermistor 5 x 0.1 [°C]
+6	TH6	Thermistor 6 x 0.1 [°C]
+7	TH7	Thermistor 7 x 0.1 [°C]

Base Address	Input Registers	
	Short Name	Description
+13	63HS1	Pressure sensor x 0.1 [kg/cm2]
+15	63LS	Pressure sensor x 0.1 [kg/cm2]
+16	THHS	Thermistor 9 x 0.1 [°C]
+17	THBOX	Thermistor in box x 0.1 [°C]
+18	Tc	Condensing temperature x 0.1 [°C]
+19	Te	Evaporating temperature x 0.1 [°C]
+20	Vdc	COMP bus voltage x 0.1 [V]
+23	Iu	U-Phase current effective value x 0.1 [A]
+24	Iw	W-Phase current effective value x 0.1 [A]
+26	FAN	Fan output [Hz]
+30	QjC	Total capacity Cool
+31	QjH	Total capacity Heat
+34	SCo	Heat exchanger outlet subco olin x 0.1 [°C]
+35	SCc	Coil outlet subcooling x 0.1 [°C]
+36	SHb	Coil bypass outlet superheat x 0.1 [°C]
+37	LEV1	Linear expansion valve
+38	LEV2	Linear expansion valve

- **BC**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 11	
+1	T1	BC T1 x 0.1 [°C]
+2	T2	BC T2 x 0.1 [°C]
+3	T3	BC T3 x 0.1 [°C]
+4	T4	BC T4 x 0.1 [°C]
+5	T5	BC T5 x 0.1 [°C]
+6	T6	BC T6 x 0.1 [°C]
+7	P1	BC P1 High pressure x 0.1 [kg/cm2]
+8	P2	BC P2 High pressure x 0.1 [kg/cm2]
+9	P3	BC P3 Intermediate pressure x 0.1 [kg/cm2]
+10	L1	BC L1 Liquid level control
+11	L2	BC L2 Liquid level control
+12	L3	BC L3 Liquid level control
+13	L4	BC L4 Liquid level control

- **BC(main)**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 21	
+1	T1	BC T1 x 0.1 [°C]
+2	T2	BC T2 x 0.1 [°C]
+5	T5	BC T5 x 0.1 [°C]
+6	T6	BC T6 x 0.1 [°C]
+7	P1	BC P1 High pressure x 0.1 [kg/cm2]

Base Address	Input Registers	
	Short Name	Description
+9	P3	BC P3 Intermediate pressure x 0.1 [kg/cm2]
+10	L1	BC L1 Liquid level control
+12	L3	BC L3 Liquid level control

- **BC(main), BC(main)**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 4 Type Code = 15	
+1	T1	BC T1 x 0.1 [°C]
+2	T2	BC T2 x 0.1 [°C]
+5	T5	BC T5 x 0.1 [°C]
+6	T6	BC T6 x 0.1 [°C]
+7	P1	BC P1 High pressure x 0.1 [kg/cm2]
+9	P3	BC P3 Intermediate pressure x 0.1 [kg/cm2]
+10	L1	BC L1 Liquid level control
+11	L2	BC L2 Liquid level control
+12	L3	BC L3 Liquid level control

- **BC(sub)**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 16	
+2	T2	BC T2 x 0.1 [°C]
+5	T5	BC T5 x 0.1 [°C]
+12	L3	BC L3 Liquid level control

4.1.3 HT

4.1.3.1 HT PRO Indoor Units

Base Address	Input Registers	
	Short Name	Description
+0		
+1		
+2		
+3		
+4		
+5		
+6		
+7		
+8		
+9	iE	Expected V Opening (%)
+10	TI	Liquid Pipe Temp °C
+11	Tg	Gas Pipe Temp °C

Base Address	Input Registers	
	Short Name	Description
+12	Ti	Intake Air Temp °C
+13	To	Discharge Air Temp °C
+14	fd	Requested Frequency (Hz)
+15	Tr	Remote Sensor Temperature °C
+16		

4.1.3.2 HT PRO Outdoor Units

Base Address	Input Registers	
	Short Name	Description
+0	Outdoor Type	Outdoor Type
+1	ROM	Outdoor Control PCB ROM number
+2	Td1	Inverter Compressor 1 Top Temperature x 0.1 [°C]
+3	Td2	Inverter Compressor 2 Top Temperature x 0.1 [°C]
+4	Td3	Inverter Compressor 3 Top Temperature x 0.1 [°C]
+5	Td4	Inverter Compressor 4 Top Temperature x 0.1 [°C]
+6	Td5	Inverter Compressor 5 Top Temperature x 0.1 [°C]
+7	Td6	Inverter Compressor 6 Top Temperature x 0.1 [°C]
+8	Td	Operating Comp. Top Temperature x 0.1 [°C]
+9	Te1	Heat Exchanger Liquid Temperature 1 x 0.1 [°C]
+10	Te2	Heat Exchanger Liquid Temperature 2 x 0.1 [°C]
+11	Te3	Heat Exchanger Liquid Temperature 3 x 0.1 [°C]
+12	A1	Inverter Compressor Primary Current 1 [A]
+13	A2	Inverter Compressor Primary Current 2 [A]
+14	A3	Inverter Compressor Primary Current 3 [A]
+15	A4	Inverter Compressor Primary Current 4 [A]
+16	A5	Inverter Compressor Primary Current 5 [A]
+17	A6	Inverter Compressor Primary Current 6 [A]
+18	oE1	Outdoor Expansion valve MV1 opening [%]
+19	oE2	Outdoor Expansion valve MV2 opening [%]
+20	oE3	Outdoor Expansion valve MV3 opening [%]
+21	A12	Inv Comp1 2nd Current x2 [A]
+22	Tfin	Inv Fin Temperature x 0.1 [°C]
+23	Pd	Discharge (high) Pressure x 0.1 [MPa]
+24	Ps	Suction (low) Pressure x 0.1 [MPa]
+25	Fo	Air Flow Fan Tap
+26	H1	Inverter Comp Frequency [Hz]
+27	H2	Total Frequency [Hz]
+28	cc	Run Comp Quality
+29	Ta	Outdoor Temperature x 0.1 [°C]
+30	Y1 - **Bitfields**: Bit 6 - YFAN1 - FAN1 Relay	Relays Status

4.1.4 LG

4.1.4.1 LG PRO Indoor Units

Base Address	Input Registers	
	Short Name	Description
+0	Capa	Capacity
+1	EEV	Electronic Expansion Valve
+2	PipeIn	Pipe In
+3	PipeOut	Pipe Out
+4	SC/SH	Super Cool/Super Heat

4.1.4.2 LG PRO Outdoor Units

- **Multi V IV**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 1	
+1	Mode	Operation Mode
+2	Err	Error Code
+3	AvgT	Average indoor temperature [°C]
+4	HiPrsTrg	Target high pressure [KPa]
+5	HiPrsTrc	Current high pressure [KPa]
+6	LoPrsTrg	Target low pressure [KPa]
+7	LoPrsTrc	Current low pressure [KPa]
+8	ComprRatio	Compression ratio x 0.1
+9	SHTrg	Target degree of super heat x 0.1 [°C]
+10	SHTrc	Current degree of super heat x 0.1 [°C]
+11	SCTrc	Current degree of subcooling x 0.1 [°C]
+12	SCSHTrg	Target degree of subcooling and super heat x 0.1 [°C]
+13	SCSCTrc	Current degree of subcooling and super heat x 0.1 [°C]
+14	Inv1TrgFrq	Inverter 1 target frequency [Hz]
+15	Inv1TrcFrq	Inverter 1 current frequency [Hz]
+16	Inv2TrgFrq	Inverter 2 target frequency [Hz]
+17	Inv2TrcFrq	Inverter 2 current frequency [Hz]
+18	Fan1Trg	FAN target RPM [rpm]
+19	Fan1Trc	FAN1 current RPM [rpm]
+20	Fan2Trc	FAN2 current RPM [rpm]
+21	MainEEV	Main EEV [pls]
+22	SubEEV	Sub EEV [pls]
+23	ScEEV	Subcooling EEV [pls]
+24	EqEEV	Oil supply EEV [pls]
+25	ViEEV1	Vapor injection EEV1 [pls]
+26	ViEEV2	Vapor injection EEV2 [pls]
+27	AirT	Outdoor air temperature x 0.1 [°C]
+28	SuctT	Compressor suction temperature x 0.1 [°C]
+29	BubT	Condenser temperature x 0.1 [°C]

Base Address	Input Registers	
	Short Name	Description
+30	DewT	Evaporator temperature x 0.1 [°C]
+31	Inv1DisT	Inverter 1 discharge temperature x 0.1 [°C]
+32	Inv2DisT	Inverter 2 discharge temperature x 0.1 [°C]
+33	HexT	Heat exchanger pipe temperature x 0.1 [°C]
+34	UpHexT	Top heat exchanger pipe temperature x 0.1 [°C]
+35	LoHexT	Bottom heat exchanger pipe temperature x 0.1 [°C]
+36	ScInT	Subcooling inlet temperature x 0.1 [°C]
+37	ScOutT	Subcooling outlet temperature x 0.1 [°C]
+38	LiqT	Liquid pipe temperature x 0.1 [°C]
+39	Inv1InCT	Inverter 1 input current x 0.1 [A]
+40	Inv2InCT	Inverter 2 input current x 0.1 [A]
+41	Inv1InVT	Inverter 1 input voltage [V]
+42	Inv2InVT	Inverter 2 input voltage [V]
+43	Inv1PwrFrq	Inverter 1 power frequency [Hz]
+44	Inv2PwrFrq	Inverter 2 power frequency [Hz]
+45	Inv1PhsCT	Inverter 1 phase current x 0.1 [A]
+46	Inv2PhsCT	Inverter 2 phase current x 0.1 [A]
+47	Fan1PhsCT	Fan1 phase current x 0.1 [A]
+48	Fan2PhsCT	Fan2 phase current x 0.1 [A]
+49	FanDcLnk	Fan DC LINK voltage [V]
+50	Inv1DcLnk	Inverter 1 DC LINK voltage [V]
+51	Inv2DcLnk	Inverter 2 DC LINK voltage [V]
+52	Inv1IpmT	Inverter 1 IPM temperature [°C]
+53	Inv2IpmT	Inverter 2 IPM temperature [°C]
+54	FanHtSnkT	Outdoor fan heat sink temperature x 0.1 [°C]
+55	DrifSnow	Drifted snow
+56	Accum 4way HexVlv HexUpVlv HexDnVlv RcvIn RcvOut SuctVlv Inv1HtVlv Inv2HtVlv OilLvl1 OilLvl2	**Bitfields:** Bit 0 - Oil return valve Bit 1 - 4 WAY valve Bit 2 - Heat exchanger valve Bit 3 - Heat exchanger top valve Bit 4 - Heat exchanger bottom valve Bit 5 - Normal close valve Bit 6 - Normal open valve Bit 7 - Suction valve Bit 8 - Inverter1 heater Bit 9 - Inverter2 heater Bit 10 - Oil level 1 Bit 11 - Oil level 2

4.1.5 Samsung

4.1.5.1 Samsung PRO Indoor Units

Base Address	Input Registers	
	Short Name	Description
+0	Capa	Capacity
+1	EvaIn	Eva IN1

Base Address	Input Registers	
	Short Name	Description
+2	EvaOut	Eva OUT1
+3	EEV	EEV
+4	**Bitfields:** Bit 0 - MTFC Bit 1 - DisCtrl Bit 2 - WindFr	 MTFC Status Discharge control Wind Free
+5	ESP	Auto ESP
+6	DisT	Discharge(Duct)
+7	DisCool	Disc. Set temp.(Cool)
+8	DisHeat	Disc. Set temp.(Heat)
+9	BstrF1	Booster Fan1
+10	BstrF2	Booster Fan2
+11	BstrF3	Booster Fan3
+12	Hum	Humidity

4.1.5.2 Samsung PRO Outdoor Units

- **DVM-S**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 1	
+1	OpMode	Operation Mode
+2	OpStat	Operation Status
+3	ErrCode	Error Code
+4	Cap	Capacity [hp]
+5	CurPow	Control Watt-meter x 0.001 [kW]
+6	TrgFreq1	Target Frequency1 [Hz]
+7	OrdFreq1	Order Frequency1 [Hz]
+8	CurFreq1	Current Frequency1 [Hz]
+9	TrgFreq2	Target Frequency2 [Hz]
+10	OrdFreq2	Order Frequency2 [Hz]
+11	CurFreq2	Current Frequency2 [Hz]
+12	HiPrs	High Pressure x 0.1 [kg/cm2]
+13	SatTPd	Saturated T_Pd [°C]
+14	LoPrs	Low Pressure x 0.1 [kg/cm2]
+15	SatTPs	Saturated T_Ps [°C]
+16	MidPrs	Mid Pressure x 0.1 [kg/cm2]
+17	DisT1	Discharge1 x 0.1 [°C]
+18	DisT2	Discharge2 x 0.1 [°C]
+19	TstOp	Test Operation(UP)
+20	CompTop1	Comp Top1 x 0.1 [°C]
+21	CompTop2	Comp Top2 x 0.1 [°C]
+22	OutT	Outdoor temperature x 0.1 [°C]

Base Address	Input Registers	
	Short Name	Description
+23	CompCur1	Compressor current1 x 0.1 [A]
+24	CompCur2	Compressor current2 x 0.1 [A]
+25	IPM1T	IPM1 temperature x 0.1 [°C]
+26	IPM2T	IPM2 temperature x 0.1 [°C]
+27	CondOutT	CondOut temperature x 0.1 [°C]
+28	LiqTubT	Liquid tube temperature x 0.1 [°C]
+29	Suct1T	Suction1 temperature x 0.1 [°C]
+30	Suct2T	Suction2 temperature x 0.1 [°C]
+31	MainEEV	Main EEV
+32	EviEEV	EVI EEV
+33	EviIn	EVI IN x 0.1 [°C]
+34	EviOut	EVI OUT x 0.1 [°C]
+35	OutFnSt	Outdoor Fan Step
+36	PFCM	PFCM Temperature x 0.1 [°C]
+37	Comp1 Comp2 4Way HotGas1 HotGas2 MainCool EEVVlv EviSol1 EviSol2 EviBps CCH1 CCH2	**Bitfields:** Bit 0 - Comp1 Bit 1 - Comp2 Bit 2 - 4Way valve Bit 3 - Hot Gas Bypass1 Bit 4 - Hot Gas Bypass2 Bit 5 - Main Cooling Bit 6 - EEV Valve Bit 7 - EVI Solenoid Valve1 Bit 8 - EVI Solenoid Valve2 Bit 9 - EVI Bypass Bit 10 - Comp Coil Heater1 Bit 11 - Comp Coil Heater2

4.1.6 Gree GMV5

4.1.6.1 Gree GMV5 PRO Indoor Units

Base Address	Input Registers	
	Short Name	Description
+0	GenVer	General Protocol Version
+1	UnitVer	Unit Protocol Version
+2	PwrTp	Power Type
+3	RatedCap	Rated Capacity
+4	InPipT	Inlet Pipe Temp
+5	OutPipT	Outlet Pipe Temp
+6	OutAirT	Outlet Air Temp
+7	EXV	EXV Status
+8	**Bitfields:** Bit 0 - AuxE-htr Bit 1 - Ms/Sl Bit 2 - SolVlvHt Bit 3 - LoPrsSolVlv Bit 4 - BpsSolVlv	 Aux E-heater Master IDU Solenoid valve of heating Low pressure of solenoid valve By-pass solenoid valve

4.1.6.2 Gree GMV5 PRO Outdoor Units

- **GMV5**

Base Address	Input Registers	
	Short Name	**Description**
+0	Type Code = 1	
+1	RatedCap	Rated Capacity x 0.1 [kW]
+2	MsSlStat	Master-Slave Status
+3	GenVer	General Protocol Version
+4	UnitVer	Unit Protocol Version
+5	PwrTp	Power Type
+6	FanTp	Fan Type
+7	FanEmerg	Fan Emergency
+8	OutT	Outdoor Temp [°C]
+9	Comp1OpFreq	Comp1 Operation Frequency [Hz]
+10	Comp2OpFreq	Comp2 Operation Frequency [Hz]
+11	Fan1OpFreq	Fan1 Operation Frequency [Hz]
+12	Fan2OpFreq	Fan2 Operation Frequency [Hz]
+13	MdlHp	Module HP [°C]
+14	MdlLp	Module LP [°C]
+15	Comp1DisT	Comp1 Discharge Temp [°C]
+16	Comp1ShT	Comp1 Shell Temp [°C]
+17	Comp2DisT	Comp2 Discharge Temp [°C]
+18	Comp2ShT	Comp2 Shell Temp [°C]
+19	DfrsT1	Defrosting Temp1 [°C]
+20	SubClLiqT	Subcooler Liq Temp [°C]
+21	SubClGsT	Subcooler Gas Temp [°C]
+22	SepInT	Separator Inlet Temp [°C]
+23	SepOutT	Separator Outlet Temp [°C]
+24	HtEXV	Heating EXV [Pls]
+25	FanStcPrs	High Static Pressure
+26	Comp1Stat Comp2Stat 4wayVlv1 LpMrsVlv	**Bitfields:** Bit 0 - Comp1 Status Bit 1 - Comp2 Status Bit 2 - 4-way Valve1 Bit 3 - LP Measure Valve
+27	Comp1Cur	Comp1 Current [A]
+28	Comp1BsbV	Comp1 Basbar Voltage [V]
+29	Comp1IpmT	Comp1 IPM Temp [°C]
+30	Fan1Cur	Fan1 Current [A]
+31	Fan1BsbV	Fan1 Basbar Voltage [V]
+32	Fan1IpmT	Fan1 IPM Temp [°C]
+33	Comp2Cur	Comp2 Current [A]
+34	Comp2BsbV	Comp2 Basbar Voltage [V]
+35	Comp2IpmT	Comp2 IPM Temp [°C]
+36	Fan2Cur	Fan2 Current [A]
+37	Fan2BsbV	Fan2 Basbar Voltage [V]

Base Address	Input Registers	
	Short Name	Description
+38	Fan2IpmT	Fan2 IPM Temp [°C]

- **GMV5 HR**

Base Address	Input Registers	
	Short Name	Description
+0	Type Code = 2	
+1	RatedCap	Rated Capacity x 0.1 [kW]
+2	MsSlStat	Master-Slave Status
+3	GenVer	General Protocol Version
+4	UnitVer	Unit Protocol Version
+5	PwrTp	Power Type
+6	FanTp	Fan Type
+7	FanEmerg	Fan Emergency
+8	OutT	Outdoor Temp [°C]
+9	Comp1OpFreq	Comp1 Operation Frequency [Hz]
+10	Comp2OpFreq	Comp2 Operation Frequency [Hz]
+11	Fan1OpFreq	Fan1 Operation Frequency [Hz]
+12	Fan2OpFreq	Fan2 Operation Frequency [Hz]
+13	MdlHp	Module HP [°C]
+14	MdlLp	Module LP [°C]
+15	Comp1DisT	Comp1 Discharge Temp [°C]
+16	Comp1ShT	Comp1 Shell Temp [°C]
+17	Comp2DisT	Comp2 Discharge Temp [°C]
+18	Comp2ShT	Comp2 Shell Temp [°C]
+19	DfrsT1	Defrosting Temp1 [°C]
+20	SubClLiqT	Subcooler Liq Temp [°C]
+21	SubClGsT	Subcooler Gas Temp [°C]
+22	SepInT	Separator Inlet Temp [°C]
+23	SepOutT	Separator Outlet Temp [°C]
+24	HtEXV	Heating EXV [Pls]
+25	FanStcPrs	High Static Pressure
+26	Comp1Stat Comp2Stat 4wayVlv1 LpMrsVlv 4wayVlv2 OiRtVlv1 OiRtVlv2	**Bitfields:** Bit 0 - Comp1 Status Bit 1 - Comp2 Status Bit 2 - 4-way Valve1 Bit 3 - LP Measure Valve Bit 4 - 4-way Valve2 Bit 5 - Oil Return Valve1 Bit 6 - Oil Return Valve2
+27	Comp1Cur	Comp1 Current [A]
+28	Comp1BsbV	Comp1 Basbar Voltage [V]
+29	Comp1IpmT	Comp1 IPM Temp [°C]
+30	Fan1Cur	Fan1 Current [A]
+31	Fan1BsbV	Fan1 Basbar Voltage [V]
+32	Fan1IpmT	Fan1 IPM Temp [°C]
+33	Comp2Cur	Comp2 Current [A]

Base Address	Input Registers	
	Short Name	Description
+34	Comp2BsbV	Comp2 Basbar Voltage [V]
+35	Comp2IpmT	Comp2 IPM Temp [°C]
+36	Fan2Cur	Fan2 Current [A]
+37	Fan2BsbV	Fan2 Basbar Voltage [V]
+38	Fan2IpmT	Fan2 IPM Temp [°C]
+39	Comp1BkOiT	Comp1 Back Oil Temp [°C]
+40	Comp2BkOiT	Comp2 Back Oil Temp [°C]
+41	SbclEXV	Subcooler EXV [Pls]

5 Commands Reference

5.1 line

SYNOPSIS

```
line
line type <Ln> <TYPE>
line myid <Ln> <SA>
line baud <Ln> <FRAME>
```

DESCRIPTION

<Ln> parameter denotes communication line number like for example: **L3** or **L4**.

- Without parameters **line** command prints status of all communication lines available in specific device.
- **line type** command is used to activate Modbus RTU module on line **<Ln>. <TYPE>** parameter can be **CG5** or **CG4** (see Legacy CoolGate Mode) for CoolMasterNet device and **CLMB** for CooLinkNet device.
- **line myid** command will change Modbus Slave Address of the Modbus RTU module running on line **<Ln>.** Parameter **<SA>** is a new Modbus Slave Address in hexadecimal format. Accepted range of addresses is 01..F7 . New address will be in use after power reset.
- **line baud** command is used to change Modbus RTU frame format for line **<Ln>**. **<FRAME>** parameter format is **<BAUD>_<8|9><N|E|O><1|2>**. Supported baud rates for **<BAUD>** parameter are: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200. Frame format change is effective only after power reset.

EXAMPLE

See examples in Modbus RTU Configuration chapter.

5.2 modbus

SYNOPSIS

```
modbus
modbus IP <enable|disable>
modbus server port <PORT>
modbus ignore r
modbus cg4
```

DESCRIPTION

This command is available only in CoolMasterNet device.

- Without parameters **modbus** command prints status of the Modbus IP Server.
- **modbus IP** command is used to enable or disable Modbus IP activation.
- **modbus server port** command will change Modbus IP Server TCPI/IP port number. New port number will be effective only after power reset.
- **modbus ignore r** command will toggle ignore flag used by Modbus RTU module in attempt to access non implemented holding or input register. If ignore flag is set, attempt to access non existing register(s) will not

cause the "Illegal Data Address" Modbus exception. This feature enables accessing of the multiple registers block with gap(s).
- **modbus cg4** command is used for legacy CoolGate Modbus RTU operation mode (see Legacy CoolGate Mode). It prints relation between detected UID's and CoolGate Modbus objects Base Addresses.

EXAMPLE

See examples in Modbus IP Configuration chapter.

5.3 va

SYNOPSIS

```
va
va auto
va + <UID> <VA>
va delall
va - <UID>|<VA>
va ram <N>
```

DESCRIPTION

This command is available only in CoolMasterNet device.
<UID> parameter denotes Indoor Unit identifier/number like for example: **L1.100** or **L2.003**. **<VA>** parameter denotes VA number in decimal format.
- Without parameters **va** command prints status of all allocated VA's.
- **va auto** command is used to automatically distribute VA's for all detected UID's one to one. Previously allocated VA's will be deleted
- **va + <UID> <VA>** command will allocate VA for given UID. Number of VA's allocated for UID is not limited.
- **va delall** command will delete all allocated VA's.
- **va - <UID>** will delete all allocated VA's for given UID.
- **va - <VA>** will delete specific VA.
- **va ram <N>** resizes RAM memory used for VA's. Parameter **<N>** denotes a desired total number of VA's that can be allocated. By default N=170. VA's memory resize is effective only after power reset.

EXAMPLE

See examples in VA's Configuration chapter.

6 Legacy CoolGate Mode

CoolMasterNet Modbus RTU module can be configured to work in legacy CoolGate mode. This is done for backward compatibility with CoolAutomation's CoolGate devices. This mode is not recommended for use in new projects.
Activation of legacy CoolGate mode is made with below command:

```
>line type L3 CG4
OK, Boot Required!
```

In this case a number of critical limitations should be taken in account:

- HVAC communication lines are not distinguished. I.e. for example, UID's L1.101 and L2.101 are treated as a same indoor unit.
- UID's range is limited.
- Only Modbus RTU mode is supported. Modbus IP is not supported in CoolGate mode.
- Features available in CoolMasterNet that were not previously implemented in CoolGate devices are not accessible via Modbus RTU module in CoolGate mode.

Details of the CoolGate Modbus implementation can be found in CoolGate Programmer Reference Manual. Minor changes and improvements made in CoolMasterNet Modbus RTU module compared to CoolGate are depicted in following subchapters.

6.1 DK

6.1.1 DK PRO via Airnet address

In CoolMasterNet, access to DK PRO Outdoor System and Outdoor Unit parameters is primary made via Airnet address and not via internal address as it was in CoolGate. Airnet address has a precedence over internal address and access is made according to the below tables.

Outdoor System Airnet Address	Outdoor System CoolGate Base Address (Hex)	Outdoor System
1	0x0801	S0
2	0x0811	S1
3	0x0821	S2
4	0x0831	S3
5	0x0841	S4
6	0x0851	S5
7	0x0861	S6
8	0x0871	S7
9	0x0881	S8
10	0x0891	S9
11	0x08A1	S10
12	0x08B1	S11

Outdoor System Airnet Address	Outdoor Unit & CoolGate Base Address (Hex)		
	Master	Slave 1	Slave 2
1	S0U2 0x0921	S0U3 0x0941	S0U4 0x0961
2	S1U2 0x09A1	S1U3 0x09C1	S1U4 0x09E1
3	S2U2 0x0A21	S2U3 0x0A41	S2U4 0x0A61

4	S3U2 0x0AA1	S3U3 0x0AC1	S3U4 0x0AE1
5	S4U2 0x0B21	S4U3 0x0B41	S4U4 0x0B61
6	S5U2 0x0BA1	S5U3 0x0BC1	S5U4 0x0BE1
7	S6U2 0x0C21	S6U3 0x0C41	S6U4 0x0C61
8	S7U2 0x0CA1	S7U3 0x0CC1	S7U4 0x0CE1
9	S8U2 0x0D21	S8U3 0x0D41	S8U4 0x0D61
10	S9U2 0x0DA1	S9U3 0x0DC1	S9U4 0x0DE1
11	S10U2 0x0E21	S10U3 0x0E41	S10U4 0x0E61
12	S11U2 0x0EA1	S11U3 0x0EC1	S11U4 0x0EE1

6.1.2 DK PRO Outdoor Systems

Base Address	Input Registers	
+0	System HP	
+1	System Current in 0.1A units	
+2	Evaporation Temperature x10 °C	
+3	Condensing Temperature x10 °C	
+4	System Failure	
+5	Bitfields LSB Bit 0 - Cooling Bit 1 - Heating Bit 2 - Ventilation Bit 3 - Thermostat_ON Bit 4 - Standby_ON Bit 5 - Defrost Bit 6 - Startup Control Bit 14 - VRV3 Bit 15 - VRV4	
	VRV3	VRV4
+6		Operation Control Mode
+7		I/U Thermostat ON Capacity x10
+8	System AirNet Address	

6.1.3 DK PRO Outdoor Units

Base Address	Input Registers	
	VRV3	VRV4
+0	Outdoor System Number	
+1	HP	
+2	Ambient Temperature °C	
+3	Suction Temperature °C	Inv1 Rotation Amnt
+4	Evaporation Temperature °C	
+5	Condensing Temperature °C	
+6	Inverter Revolution Speed	Inv2 Rotation Amnt
+7	EV Opening 1	

+8	EV Opening 2	
+9	CT1 (STD1)	Fan1 Rotation Amnt
+10 0x0A	CT1 (STD2)	Fan2 Rotation Amnt
+11 0x0B	Fan Step	
+12 0x0C	Coil Temperature °C	Comp1 Discharge Temp °C
+13 0x0D	Discharge Temperature (INV) °C	Comp2 Discharge Temp °C
+14 0x0E	Discharge Temperature (STD1) °C	Comp Surface Temp °C
+15 0x0F	Discharge Temperature (STD2) °C	Acc Inlet Temp °C
+16 0x10	Acc Entrance Temperature °C	R4T Exchange Temp °C / Heat Exchanger Temp °C
+17 0x11	Receiver Liquid Temperature °C	R7T Exchange Temp °C / Heat Exchanger Liquid Pipe Temp °C
+18 0x12	Inverter Temperature °C	SBC Exchange Liquid Temp °C
+19 0x13	Inverter Current	SBC Excahnge Gas Temp °C
+20 0x14	Inverter FAN Current	Inv1 Fin Temp °C
+21 0x15	Bitfields LSB Bit 0 - Compressor1 (INV) Bit 1 - Compressor2 (STD1) Bit 2 - Compressor3 (STD2) Bit 3 - Oil_return Bit 4 - Hot_Gas Bit 5 - Crank Case Heater (CH1) Bit 6 - Crank Case Heater (CH2) Bit 7 - Crank Case Heater (CH3) Bit 8 - Soft Start Bit 9 - Restart Standby Bit 10 - Multi Oil Bit 11 - Error State	Inv2 Fin Temp °C
+22 0x16	EV Opening 3	
+23 0x17	SBC Coil Exit Temp °C	Comp1 Current
+24 0x18		Comp2 Current
+25 0x19		Inverter FAN Primary Current
+26 0x1A		Bitfields LSB Bit 0 - INV1 Bit 1 - INV2 Bit 2 - Crank Case Heater (CH1) Bit 3 - Crank Case Heater (CH2) Bit 4 - 4 Way Valve Bit 5 - Oil Return 1 Bit 6 - Acc Oil Return Bit 7 - Oil Return 2 Bit 8 - 4 Way Valve Heating Bit 9 - Own Unit Error
+27 0x1B	AirNet Address	