

## *R&D Technical Guide: Standard Modbus Table*

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### *1) Communication Parameters*

<b>Baud Rate</b>	19200
<b>Data Bits</b>	8
<b>Start Bit</b>	1
<b>Stop Bit</b>	1
<b>Parity</b>	Even

<b>Modbus Default Unit Address</b>	0x01
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<b>Modbus Read Holding Register</b>	0x03
<b>Modbus Write Single Holding Register</b>	0x06
<b>Modbus Write Multiple Registers</b>	0x10

## 2) Modbus Table

Register Name	Address	R/W	Sign	Factor
SET_NETWORK_COOLING_SETPOINT	0	RW	S	10
SET_NETWORK_HIGH_TEMP_ALARM_SETPOINT	1	RW	S	10
SET_NETWORK_LOW_TEMP_ALARM_SETPOINT	2	RW	S	10
SET_NETWORK_HEATER_SETPOINT	3	RW	S	10
SET_ENABLE_FLAGS	4	RW	U	1
READ_CONTROL_SETPOINT	5	RO	S	10
READ_HIGH_TEMP_SETPOINT	6	RO	S	10
READ_LOW_TEMP_SETPOINT	7	RO	S	10
READ_HEATER_SETPOINT	8	RO	S	10
READ_TEMP_POT	9	RO	S	10
READ_ALARM_POT	10	RO	S	10
READ_HEATER_POT	11	RO	S	10
READ_CONTROL_SENSOR	12	RO	S	10
READ_STATE	13	RO	U	1
READ_ALARM_STATUS	14	RO	U	1
READ_OUTPUT_STATUS	15	RO	U	1
READ_CONTACT_STATUS	16	RO	U	1
READ_INTERNAL_AIR_OUTLET_TEMP	17	RO	S	10
READ_AMBIENT_TEMP	18	RO	S	10
READ_ACTUAL_SPEED_INT_BLOWER	19	RO	U	1
READ_ACTUAL_SPEED_AMB_BLOWER	20	RO	U	1
READ_ACTUAL_SPEED_COMPRESSOR	21	RO	U	1
READ_SET_SPEED_INT_BLOWER	22	RO	U	1
READ_SET_SPEED_AMB_BLOWER	23	RO	U	1
READ_SET_SPEED_COMPRESSOR	24	RO	U	1
READ_ALARM_INT_BLOWER	25	RO	U	1
READ_ALARM_AMB_BLOWER	26	RO	U	1
READ_ALARM_COMPRESSOR	27	RO	U	1
READ_ICE_TEMP	28	RO	S	10
READ_PRESSURE_TEMP	29	RO	S	10
SET_UNIT_ADDRESS	40	RW	U	1

<b>R/W</b>	Register <b>Read/Write</b> or <b>Read Only</b>
<b>Sign</b>	<b>S</b> : Signed Integer, <b>U</b> : Unsigned Integer
<b>Factor</b>	Representation Factor, example for setting SET_NETWORK_COOLING_SETPOINT to 31.5C, will need to send 315.

All setpoints of all units can be set via Modbus with a precision of 0.1K. This means that cooling or heating can start operating at any set temperature down to 0.1K precision but accuracy/tolerance is within +/-3K. Only Variable Speed units have an accuracy of +/- 0.1K.

### 3) Unit Availability

Register Name	Address	Unit A	Unit B	Unit C	Unit D
SET_NETWORK_COOLING_SETPOINT	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SET_NETWORK_HIGH_TEMP_ALARM_SETPOINT	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SET_NETWORK_LOW_TEMP_ALARM_SETPOINT	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SET_NETWORK_HEATER_SETPOINT	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SET_ENABLE_FLAGS	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_CONTROL_SETPOINT	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_HIGH_TEMP_SETPOINT	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_LOW_TEMP_SETPOINT	7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_HEATER_SETPOINT	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_TEMP_POT	9		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
READ_ALARM_POT	10		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
READ_HEATER_POT	11		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
READ_CONTROL_SENSOR	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_STATE	13		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_ALARM_STATUS	14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_OUTPUT_STATUS	15	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_CONTACT_STATUS	16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
READ_INTERNAL_AIR_OUTLET_TEMP	17		<input checked="" type="checkbox"/>		
READ_AMBIENT_TEMP	18		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
READ_ACTUAL_SPEED_INT_BLOWER	19		<input checked="" type="checkbox"/>		
READ_ACTUAL_SPEED_AMB_BLOWER	20		<input checked="" type="checkbox"/>		
READ_ACTUAL_SPEED_COMPRESSOR	21		<input checked="" type="checkbox"/>		
READ_SET_SPEED_INT_BLOWER	22		<input checked="" type="checkbox"/>		
READ_SET_SPEED_AMB_BLOWER	23		<input checked="" type="checkbox"/>		
READ_SET_SPEED_COMPRESSOR	24		<input checked="" type="checkbox"/>		
READ_ALARM_INT_BLOWER	25		<input checked="" type="checkbox"/>		
READ_ALARM_AMB_BLOWER	26		<input checked="" type="checkbox"/>		
READ_ALARM_COMPRESSOR	27		<input checked="" type="checkbox"/>		
READ_ICE_TEMP	28				<input checked="" type="checkbox"/>
READ_PRESSURE_TEMP	29				<input checked="" type="checkbox"/>
SET_UNIT_ADDRESS	40	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**Unit A:** Units with Carel Controller (1ph and 3ph)

**Unit B:** Units with Variable Speed Controller.

**Unit C:** Units with Seifert Standard Controller (1ph and 3ph)

**Unit D:** Units with Seifert Standard Display Controller (1ph and 3ph)

#### 4) Modbus Table Description

Register Name	Description
SET_NETWORK_COOLING_SETPOINT	Cooling Setpoint set from Network
SET_NETWORK_HIGH_TEMP_ALARM_SETPOINT	Alarm High Setpoint set from Network
SET_NETWORK_LOW_TEMP_ALARM_SETPOINT	Alarm Low Setpoint set from Network
SET_NETWORK_HEATER_SETPOINT	Heater Setpoint set from Network
SET_ENABLE_FLAGS	Enable Flags (Check sections below)
READ_CONTROL_SETPOINT	Control Setpoint being used by Controller (Network or Onboard Potentiometer)
READ_HIGH_TEMP_SETPOINT	Alarm High Setpoint being used by Controller (Network or Onboard Potentiometer)
READ_LOW_TEMP_SETPOINT	Alarm Low Setpoint being used by Controller (Network only)
READ_HEATER_SETPOINT	Heater Setpoint being used by Controller (Network or Onboard Potentiometer)
READ_TEMP_POT	Control Setpoint Potentiometer Reading
READ_ALARM_POT	Alarm High Setpoint Potentiometer Reading
READ_HEATER_POT	Heater Setpoint Potentiometer Reading
READ_CONTROL_SENSOR	Sensor Reading used as Internal Temperature
READ_STATE	Unit State (Check sections below)
READ_ALARM_STATUS	Alarm Status (Check sections below)
READ_OUTPUT_STATUS	Output Status (Check sections below)
READ_CONTACT_STATUS	Contact Status (Check sections below)
READ_INTERNAL_AIR_OUTLET_TEMP	Internal Outlet Sensor Reading
READ_AMBIENT_TEMP	Ambient Sensor Reading
READ_ACTUAL_SPEED_INT_BLOWER	Actual Internal Blower Speed, RPM
READ_ACTUAL_SPEED_AMB_BLOWER	Actual Ambient Blower Speed, RPM
READ_ACTUAL_SPEED_COMPRESSOR	Actual Compressor Speed, RPS
READ_SET_SPEED_INT_BLOWER	Set Internal Blower Speed, RPM
READ_SET_SPEED_AMB_BLOWER	Set Ambient Blower Speed, RPM
READ_SET_SPEED_COMPRESSOR	Set Compressor Speed, Percentage of Max Speed
READ_ALARM_INT_BLOWER	Inverter Alarm Code Internal Blower
READ_ALARM_AMB_BLOWER	Inverter Alarm Code Ambient Blower
READ_ALARM_COMPRESSOR	Inverter Alarm Code Compressor
READ_ICE_TEMP	Icing Sensor Reading
READ_PRESSURE_TEMP	Pressure Sensor Reading
SET_UNIT_ADDRESS	Modbus Address (Check sections below)

## 5) Enable Flags (Register SET\_ENABLE\_FLAGS)

Bit	Flag Name
0	EN_NETWORK_SETPOINTS <sup>(1)(7)</sup>
8	EN_INPUT1_INVERT
10	EN_LOCK_KEYPAD <sup>(4)</sup>
11	EN_TEMP_UNIT

1. Not available on Units with Carel Controller.
2. Not available on Units with Variable Speed Controller.
3. Not available on Units with Seifert Standard Controller.
4. Only available on Units with Display.
5. Only available on Units with more than one Door Contact.
6. Only available on Three Phase Units.
7. Not available on Seifert Standard Display Controller.
8. Only available on Seifert Standard Display Controller.

Note: The above Superscripts apply for the rest of the document.

### EN\_NETWORK\_SETPOINTS

- 0: Use onboard Potentiometer for Control, High Temperature Alarm and Heater Setpoints.
- 1: Use settings from Modbus for Control, High & Low Temperature Alarm, Heater Setpoints.

### EN\_INPUT1\_INVERT

- 0: Unit OFF when Door Contact is Open.
- 1: Unit OFF when Door Contact is Closed.

### EN\_LOCK\_KEYPAD

- 0: Keypad Enabled.
- 1: Keypad Disabled.

### EN\_TEMP\_UNIT

- 0: Modbus Table and Display (if available) temperature values in Celsius.
- 1: Modbus Table and Display (if available) temperature values in Fahrenheit.

#### Important Note:

Any settings in the register SET\_ENABLE\_FLAGS, cannot be set using Multiple Register Write (Function Code 0x10). This is done to eliminate any issues if changing the Setpoints and the Temperature type (Celsius or Fahrenheit) at the same time.

Any other bits set apart from those mentioned in this documentation, will return an Error Code 0x03.

## 6) State (Register READ\_STATE)

Value	Status
0	Unit Mode OFF [All Outputs OFF]
1	Unit Mode Idle [Internal Blower ON]
2	Unit Mode Cooling [Internal/Ambient Blower, Compressor ON]
3	Unit Mode Heating [Internal Blower, Heater ON]
4	Unit Mode Testing [Testing Procedure]

## 7) Alarms (Register READ\_ALARM\_STATUS)

Bit	Alarm
0	High Internal Temperature
1	Low Internal Temperature
2	Pressure Pipe Algorithm Alarm <sup>(1) (2)</sup>
3	Faulty Ambient Sensor <sup>(1)</sup>
4	Faulty Auxiliary Sensor <sup>(1) (2) (7)</sup> <i>Or</i> Faulty Pressure Pipe Sensor <sup>(8)</sup>
5	Faulty Icing Sensor on S1 Location <sup>(1) (2) (7)</sup> <i>Or</i> Faulty Icing Sensor <sup>(8)</sup>
6	Faulty Internal Temperature Sensor
7	Carel/Inverter Communication Failure <sup>(3) (7)</sup>
8	Phase Failure <sup>(6)</sup> <i>Or</i> Phase Failure / Digital Input 2 Closed <sup>(8)</sup>
9	Alarm Compressor <sup>(1) (3) (7)</sup> <i>Or</i> Ice Algorithm Active <sup>(8)</sup>
10	Alarm Ambient Blower <sup>(1) (3) (7)</sup>
11	Alarm Internal Blower <sup>(1) (3) (7)</sup>
12	Warning Compressor <sup>(1) (3) (7)</sup>
13	Warning Ambient Blower <sup>(1) (3) (7)</sup>
14	Warning Internal Blower <sup>(1) (3) (7)</sup>
15	Alarm Delta Outlet-Inlet Temperature <sup>(1) (3) (7)</sup>

0: Alarm Not Active

1: Alarm Active

## 8) Output Status (Register READ\_OUTPUT\_STATUS)

Bit	Output Name
0	Heater
1	Internal Blower <sup>(1)(7)</sup>
2	Ambient Blower
3	Compressor

0: Output OFF

1: Output ON



## 9) Contact Status (Register READ\_CONTACT\_STATUS)

Bit	Contact Name
0	Door Contact 1
1	Door Contact 2 <sup>(5)</sup>
2	Door Contact 3 <sup>(5) (6)</sup>

0: Door Contact Closed

1: Door Contact Open

## 10) *Unit Address Change*

Unit Addressed can be changed using register SET\_UNIT\_ADDRESS (Address 40). Changing the address involves two steps, first sending an Access Code, then sending the actual new address. This prevents accidental change of the unit address. The steps are below.

1. Send word 0x0ADD to register SET\_UNIT\_ADDRESS.
2. Send the New Unit Address to register SET\_UNIT\_ADDRESS within 10 seconds of step 1.

Address 0x00 and address 0xFF are not accepted as unit address.

Address 0xFF is considered as broadcast address, meaning the unit will always respond to this address.