

R&D Technical Guide: Standard Modbus Table

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| Document No. | RDTG2001 |
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1) Communication Parameters

| | |
|------------------|-------|
| Baud Rate | 19200 |
| Data Bits | 8 |
| Start Bit | 1 |
| Stop Bit | 1 |
| Parity | Even |

| | |
|------------------------------------|------|
| Modbus Default Unit Address | 0x01 |
|------------------------------------|------|

| | |
|---|------|
| Modbus Read Holding Register | 0x03 |
| Modbus Write Single Holding Register | 0x06 |
| Modbus Write Multiple Registers | 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 |
| SET_UNIT_ADDRESS | 40 | RW | U | 1 |

| | |
|---------------|--|
| R/W | Register Read/Write or Read Only |
| Sign | S : Signed Integer, U : Unsigned Integer |
| Factor | 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 |
|--------------------------------------|---------|-------------------------------------|-------------------------------------|-------------------------------------|
| SET_NETWORK_COOLING_SETPOINT | 0 | <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"/> |
| SET_NETWORK_LOW_TEMP_ALARM_SETPOINT | 2 | <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"/> |
| SET_ENABLE_FLAGS | 4 | <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"/> |
| READ_HIGH_TEMP_SETPOINT | 6 | <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"/> |
| READ_HEATER_SETPOINT | 8 | <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"/> |
| READ_STATE | 13 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| READ_ALARM_STATUS | 14 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| READ_OUTPUT_STATUS | 15 | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> |
| READ_CONTACT_STATUS | 16 | <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"/> | |
| 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"/> | |
| SET_UNIT_ADDRESS | 40 | <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)

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 |
| SET_UNIT_ADDRESS | Modbus Address (Check sections below) |

5) Enable Flags (Register SET_ENABLE_FLAGS)

| Bit | Flag Name |
|-----|-------------------------------------|
| 0 | EN_NETWORK_SETPOINTS ⁽¹⁾ |
| 8 | EN_INPUT1_INVERT |
| 10 | EN_LOCK_KEYPAD ⁽⁴⁾ |
| 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.

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 | Compressor Failure Pressure Pipe Algorithm ^{(1) (2)} |
| 3 | Faulty Ambient Sensor ⁽¹⁾ |
| 4 | Faulty Auxiliary Sensor ^{(1) (2)} |
| 5 | Faulty Icing Sensor on S1 Location ^{(1) (2)} |
| 6 | Faulty Internal Temperature Sensor |
| 7 | Carel/Inverter Communication Failure ⁽³⁾ |
| 8 | Phase Failure ⁽⁶⁾ |
| 9 | Alarm Compressor ^{(1) (3)} |
| 10 | Alarm Ambient Blower ^{(1) (3)} |
| 11 | Alarm Internal Blower ^{(1) (3)} |
| 12 | Warning Compressor ^{(1) (3)} |
| 13 | Warning Ambient Blower ^{(1) (3)} |
| 14 | Warning Internal Blower ^{(1) (3)} |
| 15 | Alarm Delta Outlet-Inlet Temperature ^{(1) (3)} |

0: Alarm Not Active

1: Alarm Active

8) Output Status (Register READ_OUTPUT_STATUS)

| Bit | Output Name |
|-----|--------------------------------|
| 0 | Heater |
| 1 | Internal Blower ⁽¹⁾ |
| 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 ⁽⁵⁾ |
| 2 | Door Contact 3 ^{(5) (6)} |

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.