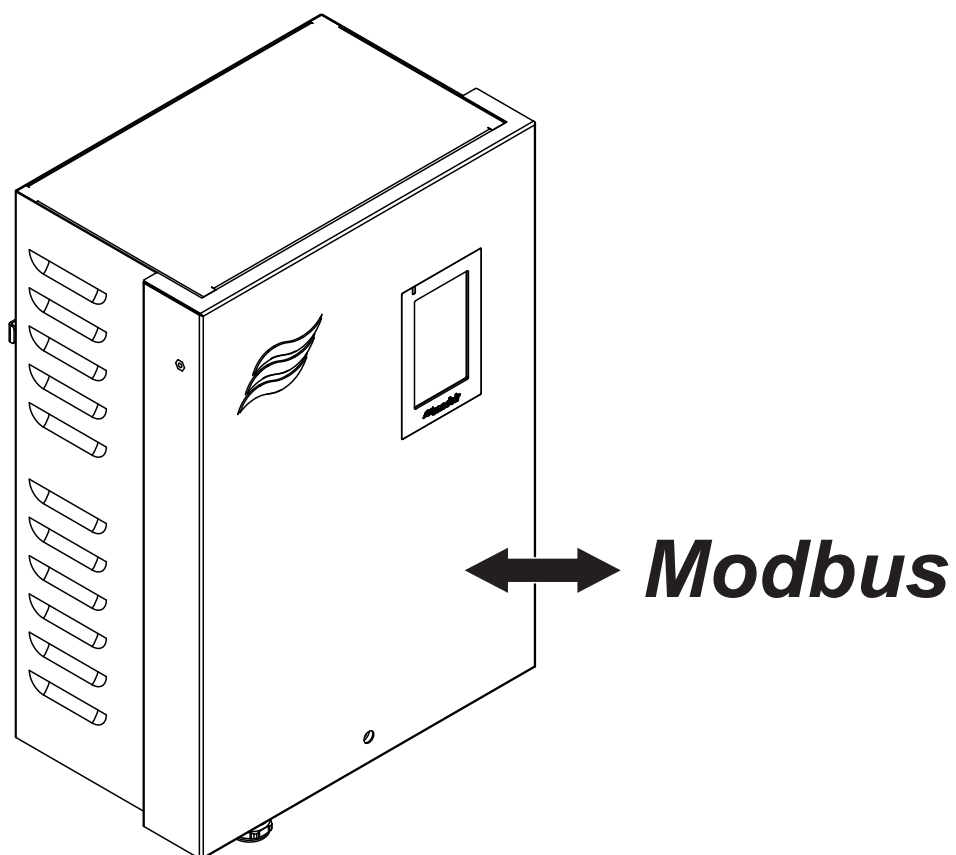




# MODBUS

Addendum manual for installation and operation  
for use with DL II, ME II, RS II, RO-E and Vita

# Thank you for choosing Condair

Installation date (MM/DD/YYYY):

Commissioning date (MM/DD/YYYY):

Site:

Model:

Serial number:

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# Contents

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|          |                                                                          |           |
|----------|--------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>Introduction</b>                                                      | <b>4</b>  |
| 1.1      | Notes on this addendum manual                                            | 4         |
| <b>2</b> | <b>For your safety</b>                                                   | <b>5</b>  |
| <b>3</b> | <b>Communication interface Integrated Controller</b>                     | <b>6</b>  |
| 3.1      | Technical data Modbus RTU                                                | 6         |
| 3.2      | Technical data Modbus TCP                                                | 7         |
| <b>4</b> | <b>Modbus RTU</b>                                                        | <b>8</b>  |
| 4.1      | Before installation                                                      | 8         |
| 4.2      | Network structure Modbus RTU                                             | 8         |
| 4.3      | Connection and configuration of the Integrated Controller for Modbus RTU | 9         |
| 4.4      | Determining the Modbus RTU interface parameters                          | 10        |
| <b>5</b> | <b>Modbus TCP</b>                                                        | <b>12</b> |
| 5.1      | Before installation                                                      | 12        |
| 5.2      | Network structure Modbus TCP                                             | 12        |
| 5.3      | Determining the Modbus TCP interface parameters                          | 13        |
| 5.3.1    | Setting the network parameters (or IP parameters)                        | 13        |
| 5.3.2    | Setting the Modbus TCP interface parameters                              | 15        |
| <b>6</b> | <b>Control settings</b>                                                  | <b>16</b> |
| 6.1      | Signal settings                                                          | 16        |
| 6.2      | Notes on monitoring of the bus communication via Register 43005          | 17        |
| 6.3      | Remote enable via Modbus (Condair DL)                                    | 17        |
| <b>7</b> | <b>Data register tables</b>                                              | <b>18</b> |
| 7.1      | Data register DL                                                         | 18        |
| 7.2      | Data register ME                                                         | 21        |
| 7.3      | Data register RS                                                         | 25        |
| 7.4      | Data register RO-E                                                       | 29        |
| 7.5      | Data register Vita                                                       | 31        |
| <b>8</b> | <b>Test of the Modbus communication</b>                                  | <b>33</b> |
| 8.1      | Modbus RTU Test                                                          | 33        |
| 8.2      | Modbus TCP Test                                                          | 34        |
| 8.3      | Read out registers                                                       | 35        |
| 8.4      | Function                                                                 | 35        |
| 8.5      | Number of registers                                                      | 36        |
| 8.6      | 32-Bit Float Register                                                    | 36        |
| 8.7      | Test tool variety                                                        | 36        |

# 1 Introduction

## 1.1 Notes on this addendum manual

This addendum manual is intended for use by engineers and properly trained technical personnel. Please read this manual thoroughly before installing and configuring the Condair Integrated Controller or a Modbus network.

If you have questions after reading this documentation, please contact your Condair representative. They will be glad to assist you.

### Symbols used in this manual



#### CAUTION!

The catchword "CAUTION" used in conjunction with the general caution symbol designates notes in this addendum manual that, if neglected, may cause **damage and/or malfunction of the unit or other material assets**.



#### WARNING!

The catchword "WARNING" used in conjunction with the general caution symbol designates safety and danger notes in this addendum manual that, if neglected, may cause to **injury to persons**.



#### DANGER!

The catchword "DANGER" used in conjunction with the general caution symbol designates safety and danger notes in this addendum manual that, if neglected, may lead to **severe injury or even death of persons**.

### Safekeeping

Please safeguard this addendum manual in a safe place, where they can be immediately accessed. If the equipment changes hands, the documentation must be passed on to the new operator.

If the documentation gets mislaid, please contact your Condair representative.

### Language versions

This operation manual is available in various languages. Please contact your Condair representative for information.

## 2 For your safety

---

### General

Every person working with the Condair Integrated Controller must have read and understood this addendum manual. Knowing and understanding the contents of the manuals is a basic requirement for protecting the personnel against any kind of danger, to prevent faulty operation, and to operate the unit safely and correctly.

All icons, signs and markings applied to the units must be observed and kept in readable state.

### Qualification of personnel

All work described in this addendum manual **may only be carried out by trained Condair service technicians**.

It is assumed that the service technicians working with the Condair Integrated Controller are familiar and comply with the appropriate regulations on work safety and the prevention of accidents.

### Danger that may arise from the Condair Integrated Controller



**DANGER!**  
**Danger of electric hazard!**

**The electrical compartment where the Integrated Controller is located may have live mains voltage connected for other uses of the device. Live parts may be exposed when the control unit is open. Touching live parts may cause severe injury or danger to life.**

**Prevention:** Before commencing any work on the control unit disconnect the mains supply voltage to the device via the electrical isolator in the mains supply line, and secure electrical isolator in "Off" position against inadvertent switching on.

### Safety reporting

All persons working with the Condair Integrated Controller are obliged to report any alterations to the system that may affect safety to the owner without delay and to secure such systems against accidental power-up.

### Prohibited modifications to the unit

No modifications must be undertaken on the Condair Integrated Controller without the express written consent of the manufacturer.

For the replacement of defective components use exclusively original accessories and spare parts available from your Condair representative.

## 3 Communication interface Integrated Controller

### 3.1 Technical data Modbus RTU

|                             |                                                                                                               |
|-----------------------------|---------------------------------------------------------------------------------------------------------------|
| Protocol                    | Modbus RTU                                                                                                    |
| Interface                   | EIA-485 (RS485) (2-wire / GND)                                                                                |
| Galvanic isolated           | No                                                                                                            |
| Connection                  | Plug-in screw terminal 3-pole:<br>Data + / Data - / GND                                                       |
| Telegram format             | 1 Start / 8 Data / 1 Parity / 1 Stop                                                                          |
| Data check                  | CRC according to Modbus RTU specification                                                                     |
| Modbus address              | 1 – 247 ( <b>10</b> )                                                                                         |
| Broadcast address           | 0                                                                                                             |
| Parity                      | None, <b>Even</b> , Odd                                                                                       |
| Baud rate                   | 4800, 9600, <b>19200</b> , 38400, 57600, 115200                                                               |
| Register sequence           | <b>MSR first</b> , LSR first                                                                                  |
| Control signal timeout      | 0-300s ( <b>300s</b> )                                                                                        |
| Max. number of devices      | 32 (according to RS485 specification)                                                                         |
| Supporting Modbus functions | 3 Read Holding Registers<br>6 Write Single Registers<br>4 Read Input Registers<br>16 Write Multiple Registers |
| Register format             | 16-Bit UInt Register<br>32-Bit Float Register                                                                 |
| Max. cable lengths/ type    | 600 m<br>Balanced twisted pair with shield, 100-120 Ohm impedance                                             |
| Topology                    | Line (Daisy Chain)                                                                                            |

**bold data = default settings**

## 3.2 Technical data Modbus TCP

|                             |                                                                                                               |
|-----------------------------|---------------------------------------------------------------------------------------------------------------|
| Protocol                    | Modbus TCP                                                                                                    |
| Interface                   | RJ45 Ethernet port                                                                                            |
| Port                        | <b>502</b> (options 1 - 65535)                                                                                |
| Modbus address              | 255                                                                                                           |
| Max. number of devices      | According Ethernet specification                                                                              |
| Bit rate                    | 10 / 100 Mbits/s (according to Ethernet specification)                                                        |
| Control signal timeout      | 0-300s ( <b>300s</b> )                                                                                        |
| Supporting Modbus functions | 3 Read Holding Registers<br>6 Write Single Registers<br>4 Read Input Registers<br>16 Write Multiple Registers |
| Register sequence           | <b>MSR first</b> , LSR first                                                                                  |
| Register format             | 16-Bit UInt Register<br>32-Bit Float Register                                                                 |
| Max. cable lengths/ type    | 100 m, CAT5 / 6                                                                                               |
| Topology                    | Bus (according to Ethernet specification)                                                                     |
| Max. number of clients      | 3                                                                                                             |

***bold data = default settings***

## 4 Modbus RTU

### 4.1 Before installation

To do installation works on the respective device you have to switch off the device and secure it from unintended switch-on according to the operation manual! Also follow any other safety instructions from the user manual. If not mentioned otherwise, the specifications of the Modbus RTU or RS485 standard apply. The installation has to be carried out in accordance with local regulations.

It's recommended to update the device software to the newest version before start the implementation of the device in a Modbus RTU network.

The respective device acts as a slave only. The Modbus RTU master - slave principle only allows the master (e.g. a control computer) to initiate data transmission. The respective slave device then reacts and exports the requested data to the master or carries out the action required by the master. In a Modbus RTU network only one master may be present.

### 4.2 Network structure Modbus RTU

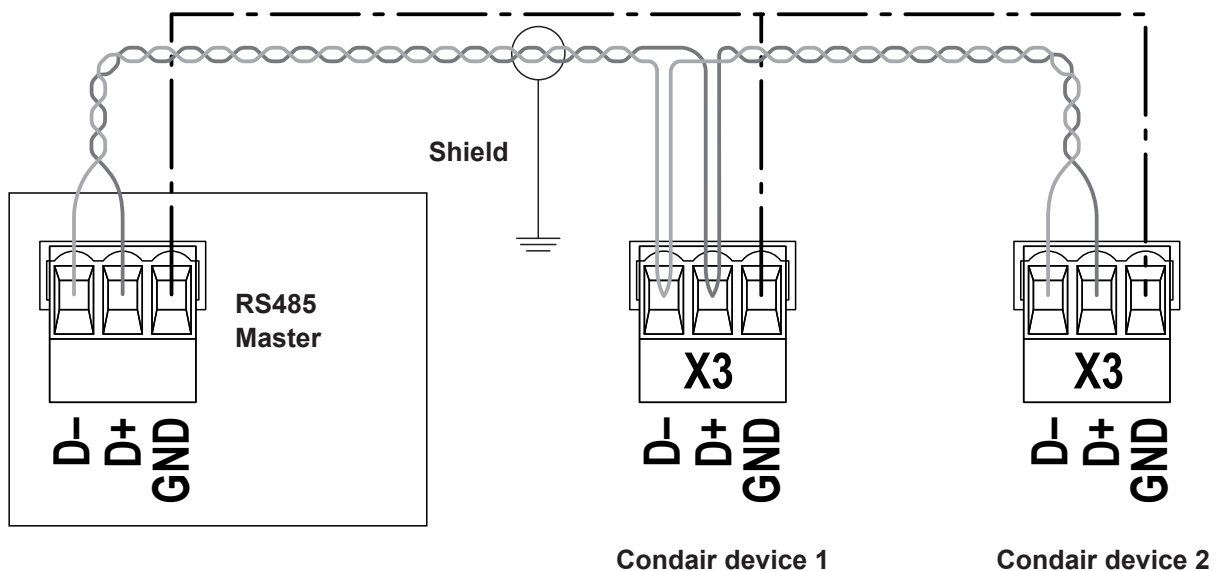


Fig. 1: Example Modbus RTU Network

- Connect the cable shield on one side with the functional earth
- Connect all GND together
- Install bus line separate from supply voltage
- Topology: Daisy chain
- All devices of the same network need the same settings concerning baud rate and parity
- Every Modbus device address can only be allocated once within the same network.



### 4.3 Connection and configuration of the Integrated Controller for Modbus RTU

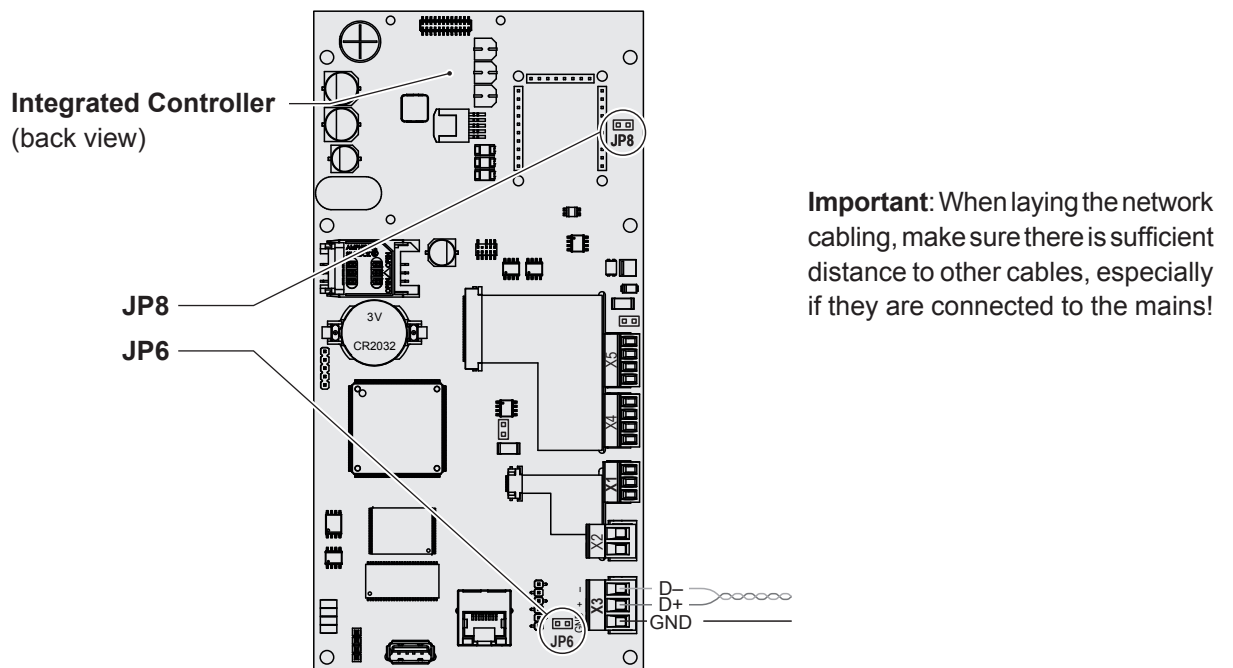


Fig. 2: Integrated Controller (back view)

- Modbus RTU communication via port X3 "BMS"
- Jumper "JP6" only has to be set for the **last** devices in the net (end of line termination at the beginning and end of the Modbus net). Jumper "JP6" set = end of line termination resistor activated.
- Jumper "JP8" has to be removed for Modbus communication via the RS485 interface.
- All devices have to be connected via GND.

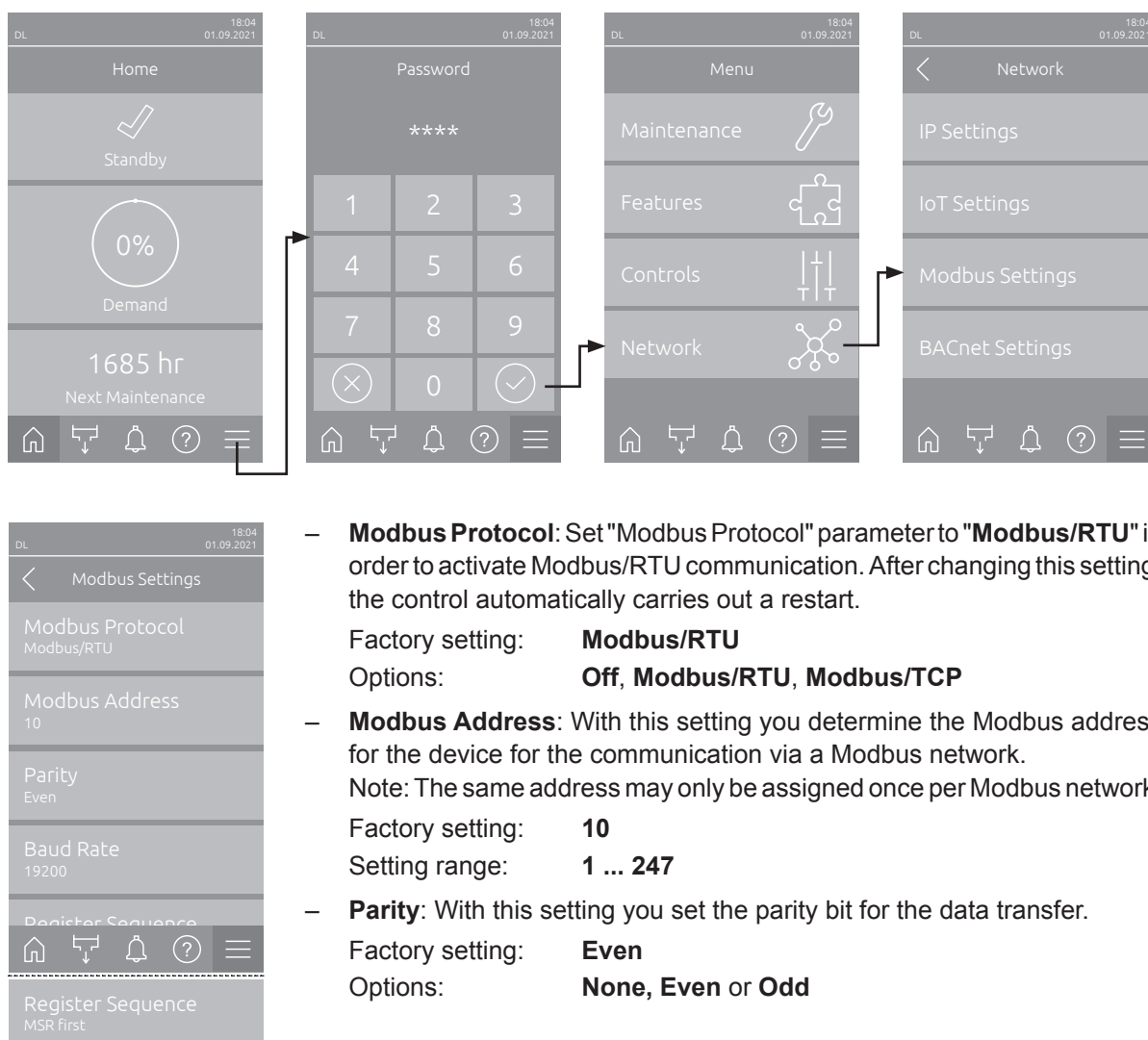
## 4.4 Determining the Modbus RTU interface parameters

The following interface parameters are fixed and can not be modified:

- 1 start bit
- 8 data bits
- 1 parity bit
- 1 stop bit

The following Modbus RTU settings must be specified. **Changes to these settings only become effective after a restart!**

Select "**Modbus Settings**" (Path: "**Menu > Password: 8808 > Network > Modbus Settings**"). The Modbus setting parameters appear.



- **Baud Rate:** With this setting you set the baud rate for the data transfer.  
**Note:** In the same Modbus network the baud rate must be the same for all participants. Only use for Modbus RTU the baud rates listed under Options.  
Factory setting:     **19200**  
Options:             **4800, 9600, 19200, 38400, 57600 or 115200**
  
- **Register Sequence:** With this setting you determine the register sequence for the transmission of floating-point numbers. .  
**Note:** With Modbus communication 32 Bit floating-point numbers are transmitted in two registers of 16 Bit each. In order that sender and receiver understand each other (that means both use the identical partitioning of the 32 Bit to the two 16 Bit registers) it must be determined whether the high-order register (MSR = Most Significant Register) or the low-order register (LSR = Least Significant Register) is transmitted first.  
Factory setting:     **MSR first**  
Options:             **LSR first** (low-order register is transmitted first)  
                          Edianness: Little Endian Byte Swapped  
                          (Format 32 Bit Float [CD] [AB])  
                          **MSR first** (high-order register is transmitted first)  
                          Edianness: Big Endian  
                          (Format 32 Bit Float [AB] [CD])

## 5 Modbus TCP

### 5.1 Before installation

To do installation works on the respective device you have to switch off the device and secure it from unintended switch-on according to the appropriate operation manual! Also follow any other safety instructions from the user manual. If not mentioned otherwise, the specifications of the Modbus TCP or Ethernet standard apply. The installation has to be carried out in accordance with local regulations.

It's recommended to update the device software to the newest version before start the implementation of the device in a Modbus TCP network. Modbus TCP is only supported as of software version 5.8.

The device acts as a server only. The Modbus TCP client - server principle only allows the client (e.g. a control computer) to initiate data transmission. The respective server (respective device) then reacts and export the requested data to the client or carries out the action required by the client.

### 5.2 Network structure Modbus TCP

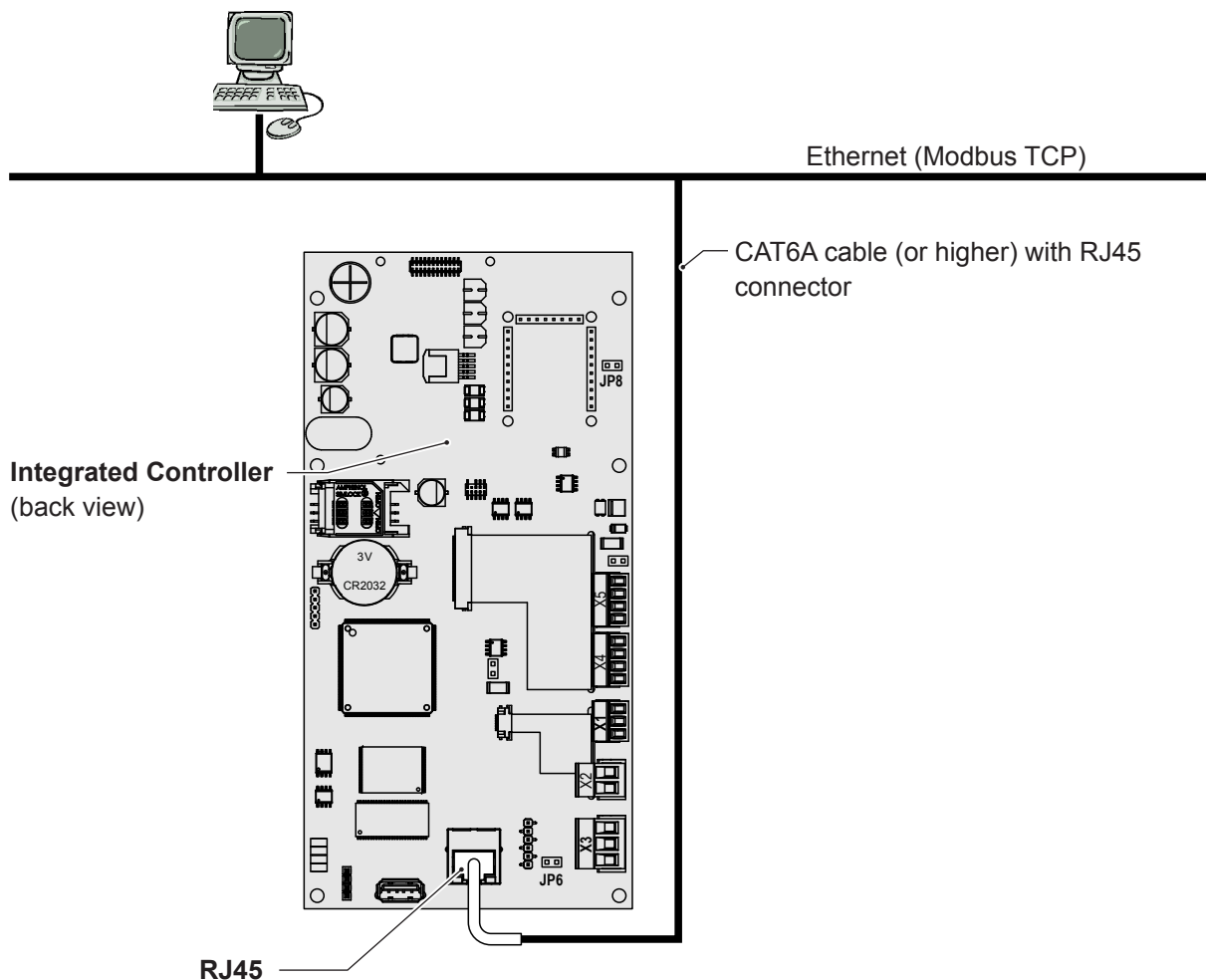


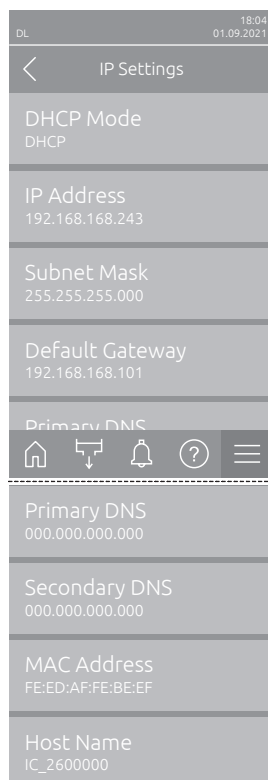
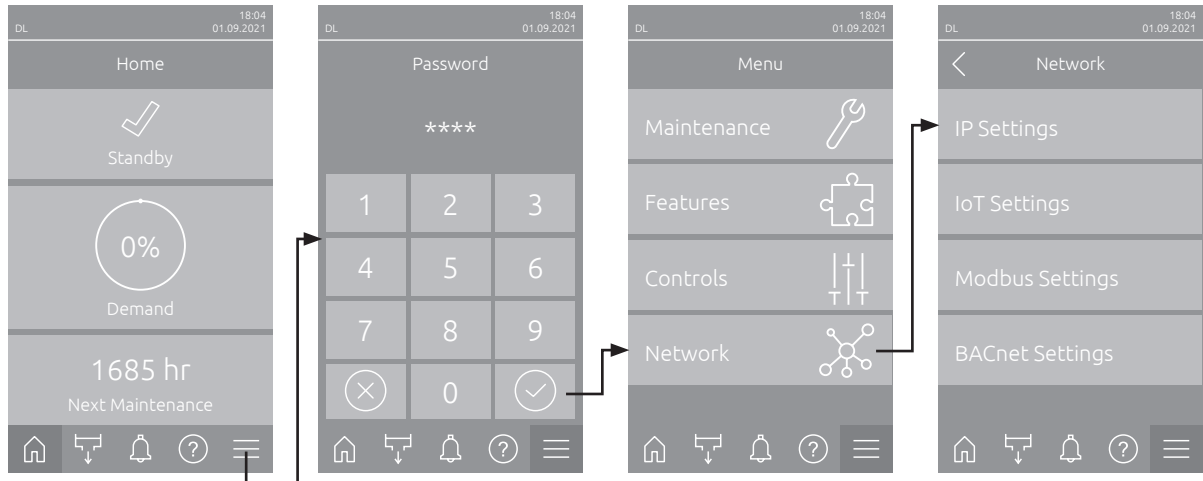
Fig. 3: Example Modbus TCP Network

## 5.3 Determining the Modbus TCP interface parameters

### 5.3.1 Setting the network parameters (or IP parameters)

The network settings (or IP settings) are used for the communication via the integrated Modbus TCP interface.

Select **"IP Settings"** (Path: **"Menu > Password: 8808 > Network > IP Settings"**). The IP setting parameters appear.



- **DHCP Mode:** With this setting you determine whether the IP Address, the Subnet Mask, the Standard Gateway as well as the Primary and Secondary DNS address should be assigned as fixed values or dynamically assigned via a DHCP server.

Note: If no address can be assigned via a DHCP server when "DHCP Mode" is set to "DHCP", an APIPA (Automatic Private IP Addressing) is automatically assigned. This is in the range from 169.254.1.0 to 169.254.254.255. The subnet mask is set to 255.255.0.0 and the standard gateway remains 0.0.0.0.

Factory setting: **DHCP**

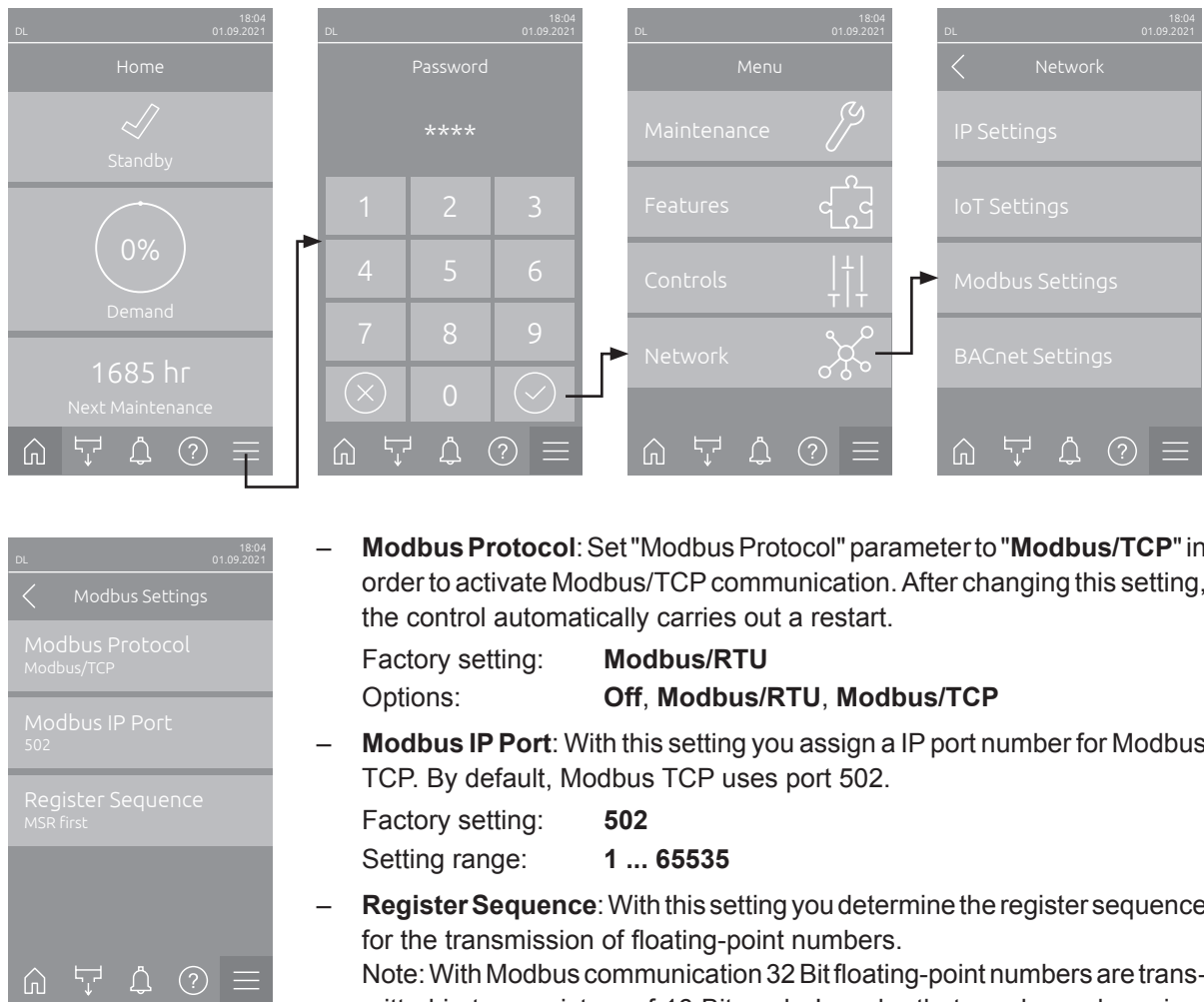
Options: **DHCP** (dynamic assignment)  
**Fixed** (fixed assignment)

- **IP Address:** This field shows the actual IP address of the device assigned manually or assigned by a DHCP server. If the parameter "DHCP Mode" is set to "Fixed", the IP address of the device can be set via this field. If the parameter "DHCP Mode" is set to "DHCP", the IP address of the device is assigned by a DHCP server.
- **Subnet Mask:** This field shows the actual subnet mask of the IP network assigned manually or assigned by a DHCP server. If the parameter "DHCP Mode" is set to "Fixed", the subnet mask can be set via this field. If the parameter "DHCP Mode" is set to "DHCP", the subnet mask is assigned by a DHCP server.

- **Default Gateway:** This field shows the actual IP address of the default gateway assigned manually or assigned by a DHCP server.  
If the parameter "DHCP Mode" is set to "Fixed", the IP address of the default gateway can be set via this field. If the parameter "DHCP Mode" is set to "DHCP", the IP address of the default gateway is assigned by a DHCP server.
- **Primary DNS:** This field shows the actual IP address of the primary domain name server (DNS) assigned manually or assigned by a DHCP server.  
If the parameter "DHCP Mode" is set to "Fixed", the IP address of the primary domain name server can be set via this field. If the parameter "DHCP Mode" is set to "DHCP", the IP address of the primary domain name server is assigned by a DHCP server.
- **Secondary DNS:** This field shows the actual IP address of the secondary domain name server (DNS) assigned manually or assigned by a DHCP server.  
If the parameter "DHCP Mode" is set to "Fixed", the IP address of the secondary domain name server can be set via this field. If the parameter "DHCP Mode" is set to "DHCP", the IP address of the secondary domain name server is assigned by a DHCP server.
- **MAC Address:** Factory set MAC Address (Media Access Control) of the device. Not modifiable.
- **Host Name:** Host Name of the device automatically generated by the control. Format: "IC\_"+"Serial number of the device". Not modifiable.

### 5.3.2 Setting the Modbus TCP interface parameters

Select "**Modbus Settings**" (Path: "**Menu > Passwortheingabe 8808 > Network > Modbus Settings**").  
The Modbus setting parameters appear.



- **Modbus Protocol:** Set "Modbus Protocol" parameter to "**Modbus/TCP**" in order to activate Modbus/TCP communication. After changing this setting, the control automatically carries out a restart.

Factory setting: **Modbus/RTU**

Options: **Off, Modbus/RTU, Modbus/TCP**

- **Modbus IP Port:** With this setting you assign a IP port number for Modbus TCP. By default, Modbus TCP uses port 502.

Factory setting: **502**

Setting range: **1 ... 65535**

- **Register Sequence:** With this setting you determine the register sequence for the transmission of floating-point numbers.

Note: With Modbus communication 32 Bit floating-point numbers are transmitted in two registers of 16 Bit each. In order that sender and receiver understand each other (that means both use the identical partitioning of the 32 Bit to the two 16 Bit registers) it must be determined whether the high-order register (MSR = Most Significant Register) or the low-order register (LSR = Least Significant Register) is transmitted first.

Factory setting: **MSR first**

Options: **LSR first** (low-order register is transmitted first)

Edianness: Little Endian Byte Swapped  
(Format 32 Bit Float [CD] [AB])

**MSR first** (high-order register is transmitted first)

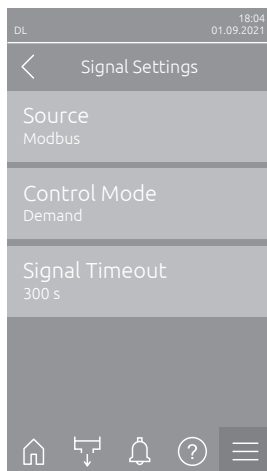
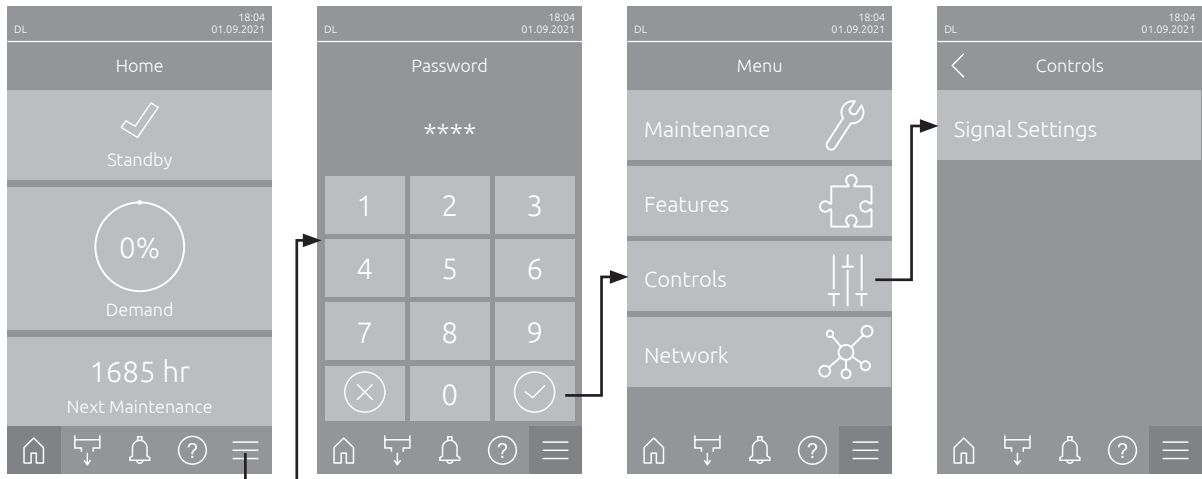
Edianness: Big Endian  
(Format 32 Bit Float [AB] [CD])

## 6 Control settings

### 6.1 Signal settings

If the demand or control signal is also to be sent via Modbus, the signal settings must be set as described below.

Select **"Signal Settings"** (Path: **"Menu > Password: 8808 > Controls > Signal Settings"**). The signal setting parameters appear.



- **Source:** Set "Source" parameter to **"Modbus"**.  
Factory setting: **Analog**  
Options: **Analog, Modbus, BACnet or IoT**
- **Control Mode:** Set the "Control mode" parameter to **"Demand"** (demand signal from an external controller) or to **"RH P"** or **"RH PI"** (humidity signal from an external humidity sensor).  
Factory setting: **Demand**  
Options: **On/Off, Demand, RH P or RH PI**
- **Signal Timeout:** With this setting you determine the timeout period for the signal transmission. If communication with the Modbus master fails for longer than the set time, warning "W35 - Signal Timeout" is triggered and the Condair DL is stopped.  
Factory setting: **300 s**  
Setting range: **1 ... 300 s**

**Important:** If the demand or control signal via Modbus is used, no second, hard-wired demand or control signal may be connected to the driver board!

Further information on the control settings can be found in the operating instructions for the corresponding device.



## 6.2 Notes on monitoring of the bus communication via Register 43005

Monitoring of the bus communication as described below takes place only if the "Source" parameter in the "Control Settings" submenu is not set to "Analog".

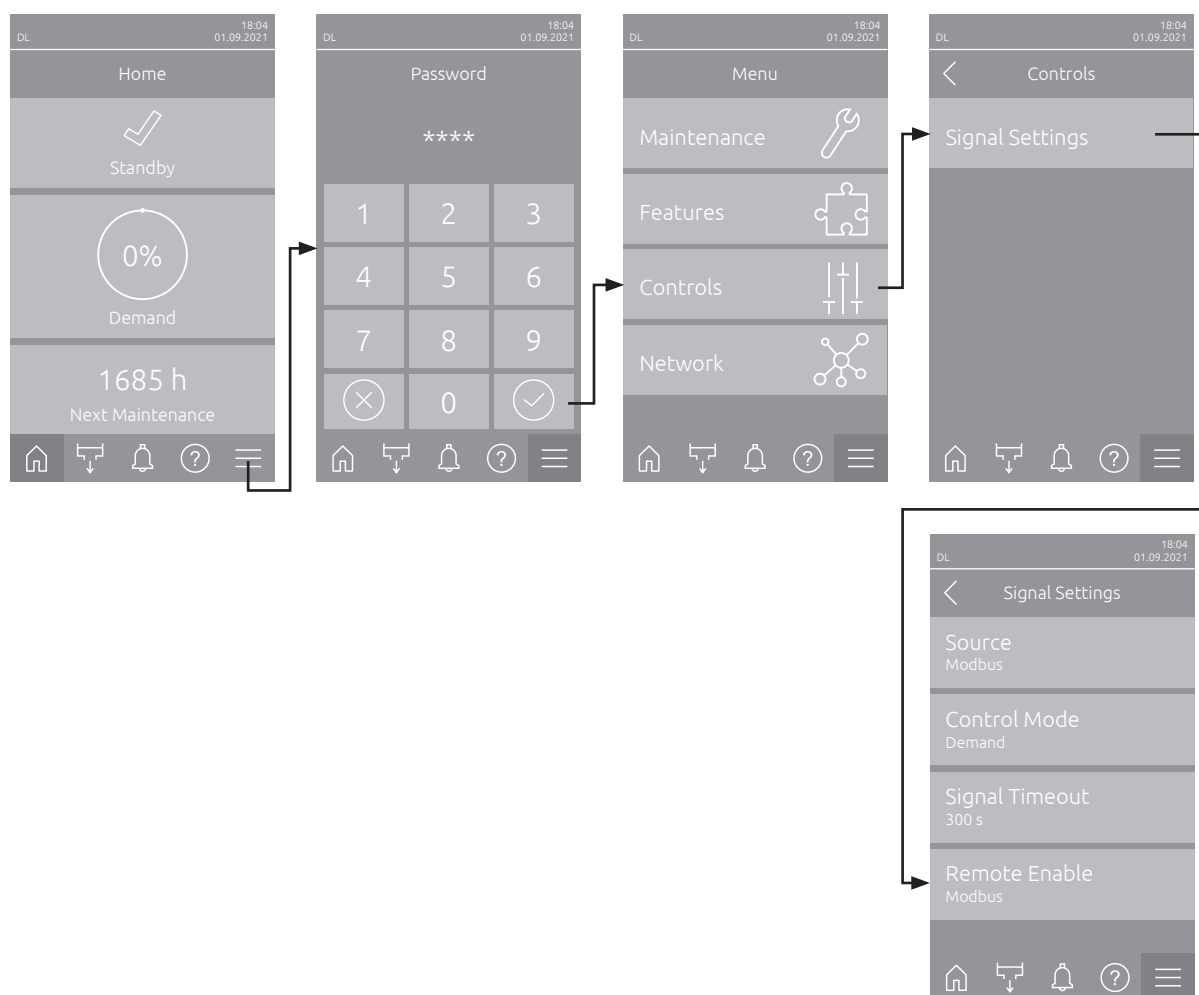
As soon as the control signal (demand or humidity signal) is transmitted via Modbus RTU or Modbus TCP, the communication via the bus system is also monitored. The control signal must be periodically updated within the time set in "Signal Timeout".

If the control signal is not updated within the set time, warning "W35 - Signal Timeout" will be triggered and the humidification will be stopped until the Modbus Master receives a valid signal into writable holding register 43005.

This monitoring is intended to prevent the humidifier from humidifying with the last transmitted value in the event of a bus failure.

## 6.3 Remote enable via Modbus (Condair DL)

To control the humidifier remotely via Modbus, the controller must be configured as follows:



With this setting, the humidifier (Condair DL) is remotely enabled via the Modbus register 43006.

## 7 Data register tables

### 7.1 Data register DL

| Name                                       | Range                                                                                                                                                                                                                                                                     | Input Register<br>1-based | Address | Format |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|--------|
| <i>Read with function 04</i>               |                                                                                                                                                                                                                                                                           |                           |         |        |
| DL Type                                    | 0 = Humidifier<br>1 = Humidifier + FC<br>2 = Humidifier + FC - Off                                                                                                                                                                                                        | 32001                     | 2000    | UInt16 |
| Device Status                              | 0 = Initializing<br>1 = Diagnostic<br>2 = Stopped<br>3 = Flushing<br>4 = Standby<br>5 = Humidifying<br>6 = Ready<br>7 = Air Cleaning<br>8 = Filling<br>9 = Conductivity Flush<br>10 = Switched Off<br>11 = Remote Off<br>12 = Temperature Flush<br>13 = Ceramic Wash Over | 32002                     | 2001    |        |
| Maintenance and<br>Error Status            | 0 = No Info<br>1 = Warning<br>2 = Activation Code<br>3 = Out of Commissioning<br>4 = Refill Disinfection<br>5 = Maintenance<br>6 = Error<br>7 = Replace Ag Cartridge<br>8 = Disinfection                                                                                  | 32003                     | 2002    |        |
| Error or Warning Code <sup>1)</sup>        | 0 = No Error                                                                                                                                                                                                                                                              | 32004                     | 2003    |        |
| Safety Loop                                | 0 = Open<br>1 = Closed (=ok)                                                                                                                                                                                                                                              | 32005                     | 2004    |        |
| Y1 Inlet Valve                             | 0 = Closed<br>1 = Open                                                                                                                                                                                                                                                    | 32006                     | 2005    |        |
| Y2 Reserve                                 | 0<br>1                                                                                                                                                                                                                                                                    | 32007                     | 2006    |        |
| Y3 Valve Air Cleaning <sup>5)</sup>        | 0 = Closed<br>1 = Open                                                                                                                                                                                                                                                    | 32008                     | 2007    |        |
| Y4 Valve External Pipe Flush <sup>5)</sup> | 0 = Closed<br>1 = Open                                                                                                                                                                                                                                                    | 32009                     | 2008    |        |
| Y5 Spray Valve                             | 0 = Closed<br>1 = Open                                                                                                                                                                                                                                                    | 32010                     | 2009    |        |
| Y6 Spray Valve                             | 0 = Closed<br>1 = Open                                                                                                                                                                                                                                                    | 32011                     | 2010    |        |
| Y7 Spray Valve                             | 0 = Closed<br>1 = Open                                                                                                                                                                                                                                                    | 32012                     | 2011    |        |
| Y8 Spray Valve                             | 0 = Closed<br>1 = Open                                                                                                                                                                                                                                                    | 32013                     | 2012    |        |
| Y9 Spray Valve                             | 0 = Closed<br>1 = Open                                                                                                                                                                                                                                                    | 32014                     | 2013    |        |

<sup>1)</sup> Refer to malfunction list in the Condair DL operation manual for a description of the malfunction codes

<sup>5)</sup> optional

| Name                                                   | Range                           | Input Register<br>1-based | Address | Format       |
|--------------------------------------------------------|---------------------------------|---------------------------|---------|--------------|
| <b>Read with function 04</b>                           |                                 |                           |         |              |
| Y10 Drain Valve (NO)                                   | 0 = Open<br>1 = Closed          | 32015                     | 2014    | UInt16       |
| Y11 Auxiliary Outlet Valve <sup>5)</sup>               | 0 = Open<br>1 = Closed          | 32016                     | 2015    |              |
| Frequency Converter Enable                             | 0 = Disable<br>1 = Enable       | 32017                     | 2016    |              |
| Frequency Converter Status                             | 0 = Off<br>1 = Power On         | 32018                     | 2017    |              |
| Fan <sup>5)</sup>                                      | 0 = On<br>1 = Off               | 32019                     | 2018    |              |
| Disinfection Pump<br>(Relay Dosing Pump) <sup>5)</sup> | 0 = Off<br>1 = On               | 32020                     | 2019    |              |
| Max. Humidification Capacity <sup>2)</sup>             | 2 - 1000 kg/h<br>4 - 2573 lb/hr | 32026                     | 2025    | 32-Bit Float |
| Actual Humidification Capacity <sup>2)</sup>           | 0 - 1000 kg/h<br>0 - 2573 lb/hr | 32028                     | 2027    |              |
| Actual Humidity or Demand                              | 0 - 100 %                       | 32030                     | 2029    |              |
| Operating Hours                                        | 0 - 1200000 h                   | 32032                     | 2031    |              |
| Next Maintenance                                       | 0 - 10000 h                     | 32034                     | 2033    |              |
| Remaining Ag-Ion Capacity                              | 0 - 58.4 Ah                     | 32036                     | 2035    |              |
| Target Ag-Ion Current                                  | 0 - 29.2 mA                     | 32038                     | 2037    |              |
| PS4 Inlet Pressure <sup>2)</sup>                       | 0 - 10.0 bar<br>0 - 145.0 psi   | 32040                     | 2039    |              |
| PS5 Nozzle Pressure <sup>2)</sup>                      | 0 - 10.0 bar<br>0 - 145.0 psi   | 32042                     | 2041    |              |
| Water Temperature <sup>2) 5)</sup>                     | °C or °F                        | 32044                     | 2043    |              |
| Water Conductivity                                     | 0 - x µS/cm                     | 32046                     | 2045    |              |
| Pump Current                                           | 0 - 6.0 A                       | 32048                     | 2047    |              |
| Ag-Ion Current                                         | 0 - x mA                        | 32050                     | 2049    |              |

<sup>2)</sup> According to the settings <Imperial> or <Metric> in the DL controller software

<sup>5)</sup> optional

| Name                                                  | Range                                                                                                                                 | Holding Register<br>1-based | Address | Format |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------|--------|
| <b>Read with function 03 / Write with function 06</b> |                                                                                                                                       |                             |         |        |
| Setpoint                                              | 0 - 95 %                                                                                                                              | 43001                       | 3000    | UInt16 |
| P-Band                                                | 6 - 65 %                                                                                                                              | 43002                       | 3001    |        |
| I-Time                                                | 1 - 60 min                                                                                                                            | 43003                       | 3002    |        |
| Capacity Limitation                                   | 20 - 100 %                                                                                                                            | 43004                       | 3003    |        |
| Actual Humidity or Demand via Modbus <sup>3)</sup>    | 0 - 100 %                                                                                                                             | 43005                       | 3004    |        |
| Remote Enable <sup>4)</sup>                           | 0 = Off<br>1 = On                                                                                                                     | 43006                       | 3005    |        |
| Remote Flushing                                       | Read:<br>100 = Off<br>0 - 99 = Progress flushing in %<br>Write:<br>0 = Stop flushing<br>1 = Start flushing                            | 45002                       | 5001    |        |
| Remote Ceramic Wash Over                              | Read:<br>100 = Off<br>0 - 99 = Progress ceramic wash over in %<br>Write:<br>0 = Stop ceramic wash over<br>1 = Start ceramic wash over | 45003                       | 5002    |        |

<sup>3)</sup> The register is only active if the parameters are configured according to [Section 6.1](#).

<sup>4)</sup> The register is only active if the parameters are configured according to [Section 6.3](#). Software version 1.4.0 or higher is required.

## 7.2 Data register ME

| Name                                  | Range                                                                                                                                                                                                                                                                                                                        | Input Register 1-based | Address | Format |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------|--------|
| <i>Read with function 04</i>          |                                                                                                                                                                                                                                                                                                                              |                        |         |        |
| System Mode                           | 0 = Humidifying<br>1 = Cooling                                                                                                                                                                                                                                                                                               | 32001                  | 2000    | UInt16 |
| Device Status                         | 0 = Initializing<br>1 = Diagnostic<br>2 = Stopped<br>3 = Humidifying<br>4 = Cooling<br>5 = Holding<br>6 = Draining<br>7 = Refreshing<br>8 = Filling<br>9 = Standby<br>10 = Diluting<br>11 = Assisted Draining<br>12 = Bleeding<br>13 = Softstart<br>14 = Switched Off<br>15 = Remote Off<br>16 = Purging<br>17 = Drain Check | 32002                  | 2001    |        |
| Maintenance and Error Status          | 0 = No Info<br>1 = Warning<br>2 = Maintenance<br>3 = WET Tank empty<br>4 = Replace PureFlo Cartridge<br>5 = Replace UV Lamp<br>6 = Matrix Wash Over<br>7 = Out of Commissioning<br>8 = Activation Code<br>9 = Error<br>10 = Disinfection Tank empty                                                                          | 32003                  | 2002    |        |
| Error or Warning Code <sup>1)</sup>   | 0 = No error                                                                                                                                                                                                                                                                                                                 | 32004                  | 2003    |        |
| Safety Loop                           | 0 = Open<br>1 = Closed (=ok)                                                                                                                                                                                                                                                                                                 | 32005                  | 2004    |        |
| Number of Running Stages              | 0 – 7 stages                                                                                                                                                                                                                                                                                                                 | 32006                  | 2005    |        |
| Fault Pump 1                          | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32007                  | 2006    |        |
| Fault Pump 2                          | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32008                  | 2007    |        |
| Fault Pump 3                          | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32009                  | 2008    |        |
| Fault Pump 4                          | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32010                  | 2009    |        |
| Fault Pump 5                          | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32011                  | 2010    |        |
| Fault Pump 6                          | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32012                  | 2011    |        |
| Fault Pump 7                          | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32013                  | 2012    |        |
| Fault Water Inlet                     | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32014                  | 2013    |        |
| Fault Water Temperature <sup>5)</sup> | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32015                  | 2014    |        |
| Fault Water Outlet                    | 0 = Fault<br>1 = Ok                                                                                                                                                                                                                                                                                                          | 32016                  | 2015    |        |

<sup>1)</sup> Refer to malfunction list in the Condair ME operation manual for a description of the malfunction codes

<sup>5)</sup> optional

| Name                                   | Range                  | Input Register<br>1-based | Address | Format |
|----------------------------------------|------------------------|---------------------------|---------|--------|
| <i>Read with function 04</i>           |                        |                           |         |        |
| Fault Level Sensor                     | 0 = Fault<br>1 = Ok    | 32017                     | 2016    | UInt16 |
| Fault Water Conductivity <sup>5)</sup> | 0 = Fault<br>1 = Ok    | 32018                     | 2017    |        |
| Speed Pump 1                           | 0 - 100 %              | 32019                     | 2018    |        |
| Speed Pump 2                           | 0 - 100 %              | 32020                     | 2019    |        |
| Speed Pump 3                           | 0 - 100 %              | 32021                     | 2020    |        |
| Speed Pump 4                           | 0 - 100 %              | 32022                     | 2021    |        |
| Speed Pump 5                           | 0 - 100 %              | 32023                     | 2022    |        |
| Speed Pump 6                           | 0 - 100 %              | 32024                     | 2023    |        |
| Speed Pump 7                           | 0 - 100 %              | 32025                     | 2024    |        |
| Water Level Tank                       | 0 - 7                  | 32026                     | 2025    |        |
| WET Tank Level <sup>5)</sup>           | 0 = Empty<br>1 = Ok    | 32027                     | 2026    |        |
| Disinfection Tank Level <sup>5)</sup>  | 0 = Empty<br>1 = Ok    | 32028                     | 2027    |        |
| Leakage Sensor <sup>5)</sup>           | 0 = Leak<br>1 = Ok     | 32029                     | 2028    |        |
| Inlet Valve                            | 0 = Closed<br>1 = Open | 32030                     | 2029    |        |
| Drain Valve                            | 0 = Open<br>1 = Closed | 32031                     | 2030    |        |
| Drain Pump                             | 0 = Off<br>1 = On      | 32032                     | 2031    |        |

<sup>5)</sup> optional

| Name                                      | Range                                 | Input Register<br>1-based | Address | Format       |
|-------------------------------------------|---------------------------------------|---------------------------|---------|--------------|
| <b>Read with function 04</b>              |                                       |                           |         |              |
| Actual Humidity or Demand                 | 0 - 100 %                             | 32038                     | 2037    | 32-Bit Float |
| Actual Air Temperature <sup>2)</sup>      | °C or °F                              | 32040                     | 2039    |              |
| Incoming Air Temperature <sup>2) 5)</sup> | °C or °F                              | 32042                     | 2041    |              |
| Actual Water Temperature <sup>2) 5)</sup> | °C or °F                              | 32044                     | 2043    |              |
| Water Conductivity <sup>5)</sup>          | 0 - x uS/cm                           | 32046                     | 2045    |              |
| UV Current <sup>5)</sup>                  | 0 - 4.0 A                             | 32048                     | 2047    |              |
| Water Capacity Stage 1 <sup>2)</sup>      | 1.0 - 360.0 kg/h<br>2.2 - 793.7 lb/hr | 32050                     | 2049    |              |
| Water Capacity Stage 2 <sup>2)</sup>      | 1.0 - 360.0 kg/h<br>2.2 - 793.7 lb/hr | 32052                     | 2051    |              |
| Water Capacity Stage 3 <sup>2)</sup>      | 1.0 - 360.0 kg/h<br>2.2 - 793.7 lb/hr | 32054                     | 2053    |              |
| Water Capacity Stage 4 <sup>2)</sup>      | 1.0 - 360.0 kg/h<br>2.2 - 793.7 lb/hr | 32056                     | 2055    |              |
| Water Capacity Stage 5 <sup>2)</sup>      | 1.0 - 360.0 kg/h<br>2.2 - 793.7 lb/hr | 32058                     | 2057    |              |
| Water Capacity Stage 6 <sup>2)</sup>      | 1.0 - 360.0 kg/h<br>2.2 - 793.7 lb/hr | 32060                     | 2059    |              |
| Water Capacity Stage 7 <sup>2)</sup>      | 1.0 - 360.0 kg/h<br>2.2 - 793.7 lb/hr | 32062                     | 2061    |              |
| Operating Hours                           | 0 - 1200000 h                         | 32064                     | 2063    |              |
| Next Maintenance                          | 0 - 10000 h                           | 32066                     | 2065    |              |
| Next UV Lamp Exchange <sup>5)</sup>       | 0 - 450 d                             | 32068                     | 2067    |              |
| Next PureFlo Exchange <sup>5)</sup>       | 0 - 365 d                             | 32070                     | 2069    |              |

<sup>2)</sup> According to the settings <Imperial> or <Metric> in the ME controller software

<sup>5)</sup> optional

| Name                                                  | Range                                                                                                                              | Holding Register<br>1-based | Address | Format       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------|--------------|
| <b>Read with function 03 / Write with function 06</b> |                                                                                                                                    |                             |         |              |
| Setpoint Humidity Control                             | 0 - 95 %                                                                                                                           | 43001                       | 3000    | UInt16       |
| P-Band Humidity Control                               | 6 - 65 %                                                                                                                           | 43002                       | 3001    |              |
| I-Time Humidity Control                               | 1 - 60 min                                                                                                                         | 43003                       | 3002    |              |
| Actual Humidity or Demand via Modbus <sup>3)</sup>    | 0 - 100 %                                                                                                                          | 43004                       | 3003    |              |
| I-Time Temperature Control                            | 1 - 60 min                                                                                                                         | 43005                       | 3004    |              |
| Setpoint Temperature Control <sup>2)</sup>            | 0 - 40 °C<br>32 - 104 °F                                                                                                           | 43011                       | 3010    | 32-Bit Float |
| P-Band Temperature Control <sup>2)</sup>              | 1 - 50 °C<br>1.8 - 89.9 °F                                                                                                         | 43013                       | 3012    |              |
| Actual Temperature via Modbus <sup>2) 6)</sup>        | -25 - 100 °C<br>-12.9 - 211.9 °F                                                                                                   | 43015                       | 3014    |              |
| Remote Draining                                       | Read:<br>100 = Off<br>0 - 99 = Progress draining in %<br>Write:<br>0 = Stop draining<br>1 = Start draining                         | 45002                       | 5001    | UInt16       |
| Remote Matrix Wash Over                               | Read:<br>100 = Off<br>0 - 99 = Progress matrix wash over in %<br>Write:<br>0 = Stop matrix wash over<br>1 = Start matrix wash over | 45003                       | 5002    |              |
| Remote Error/Warning Reset                            | 0 = Off<br>1 = On                                                                                                                  | 45004                       | 5003    |              |

<sup>2)</sup> According to the settings <Metric> or <Imperial> in the ME controller software.

<sup>3)</sup> The register is only active if the parameters are configured according to [Section 6.1](#).

<sup>6)</sup> The register is only active if the parameters are configured according to [Section 6.1](#) and the Condair ME is operated in system mode "Cooling".



## 7.3 Data register RS

| Name                            | Range                                                                                                                                                                                              | Input Register<br>1-based | Address | Format |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|--------|
| <b>Read with function 04</b>    |                                                                                                                                                                                                    |                           |         |        |
| Device Status Cyl. A            | 0 = Initializing<br>1 = Diagnostic<br>2 = Stopped<br>3 = Break<br>4 = Level Test<br>5 = Standby<br>6 = Humidifying<br>7 = Filling<br>8 = Idle<br>9 = Draining<br>10 = Remote Off<br>11 = Keep Warm | 32001                     | 2000    | UInt16 |
| Device Status Cyl. B            | 0 = Initializing<br>1 = Diagnostic<br>2 = Stopped<br>3 = Break<br>4 = Level Test<br>5 = Standby<br>6 = Humidifying<br>7 = Filling<br>8 = Idle<br>9 = Draining<br>10 = Remote Off<br>11 = Keep Warm | 32002                     | 2001    |        |
| Maintenance and Error Status    | 0 = Service Info<br>1 = Warning<br>2 = RO Service<br>3 = Extended Maintenance<br>4 = Small Maintenance<br>5 = Activation Code<br>6 = Error                                                         | 32003                     | 2002    |        |
| ErrorWarning Code <sup>1)</sup> | 0 = No error                                                                                                                                                                                       | 32004                     | 2003    |        |
| Overheat Switch Cyl. A          | 0 = Open<br>1 = Closed (=ok)                                                                                                                                                                       | 32005                     | 2004    |        |
| Overheat Switch Cyl. B          | 0 = Open<br>1 = Closed (=ok)                                                                                                                                                                       | 32006                     | 2005    |        |
| External Safety Loop Cyl. A     | 0 = Open<br>1 = Closed (=ok)                                                                                                                                                                       | 32007                     | 2006    |        |
| External Safety Loop Cyl. B     | 0 = Open<br>1 = Closed (=ok)                                                                                                                                                                       | 32008                     | 2007    |        |
| Security Floater Cyl. A         | 0 = Open<br>1 = Closed (=ok)                                                                                                                                                                       | 32009                     | 2008    |        |
| Security Floater Cyl. B         | 0 = Open<br>1 = Closed (=ok)                                                                                                                                                                       | 32010                     | 2009    |        |
| Heating Voltage Cyl. A          | 0 = Off<br>1 = On                                                                                                                                                                                  | 32011                     | 2010    |        |
| Heating Voltage Cyl. B          | 0 = Off<br>1 = On                                                                                                                                                                                  | 32012                     | 2011    |        |
| Blower Pack Cyl. A              | 0 = Off<br>1 = On (ready)                                                                                                                                                                          | 32013                     | 2012    |        |
| Blower Pack Cyl. B              | 0 = Off<br>1 = On (ready)                                                                                                                                                                          | 32014                     | 2013    |        |
| Main Contactor Cyl. A           | 0 = Off<br>1 = On                                                                                                                                                                                  | 32015                     | 2014    |        |
| Main Contactor Cyl. B           | 0 = Off<br>1 = On                                                                                                                                                                                  | 32016                     | 2015    |        |

<sup>1)</sup> Refer to malfunction list in the Condair RS operation manual for a description of the malfunction codes

| Name                                      | Range                                                                                                                                                                 | Input Register<br>1-based | Address | Format |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|--------|
| Read with function 04                     |                                                                                                                                                                       |                           |         |        |
| Relay Pump Cyl. A                         | 0 = Off<br>1 = On                                                                                                                                                     | 32017                     | 2016    | UInt16 |
| Relay Pump Cyl. B                         | 0 = Off<br>1 = On                                                                                                                                                     | 32018                     | 2017    |        |
| Inlet Valve 1 Cyl. A                      | 0 = Closed<br>1 = Open                                                                                                                                                | 32019                     | 2018    |        |
| Inlet Valve 1 Cyl. B                      | 0 = Closed<br>1 = Open                                                                                                                                                | 32020                     | 2019    |        |
| Inlet Valve 2 Cyl. A                      | 0 = Closed<br>1 = Open                                                                                                                                                | 32021                     | 2020    |        |
| Inlet Valve 2 Cyl. B                      | 0 = Closed<br>1 = Open                                                                                                                                                | 32022                     | 2021    |        |
| Drain Cooling Valve Cyl. A                | 0 = Closed<br>1 = Open                                                                                                                                                | 32023                     | 2022    |        |
| Drain Cooling Valve Cyl. B                | 0 = Closed<br>1 = Open                                                                                                                                                | 32024                     | 2023    |        |
| Complete Drain Valve Cyl. A <sup>5)</sup> | 0 = Closed<br>1 = Open                                                                                                                                                | 32025                     | 2024    |        |
| Complete Drain Valve Cyl. B <sup>5)</sup> | 0 = Closed<br>1 = Open                                                                                                                                                | 32026                     | 2025    |        |
| Leakage Sensor <sup>5)</sup>              | 0 = Off (leak)<br>1 = On                                                                                                                                              | 32027                     | 2026    |        |
| Furnace Fan <sup>5)</sup>                 | Condair UL: Remote Furnace/Fan<br>0 = Off<br>1 = On                                                                                                                   | 32028                     | 2027    |        |
| Ext. Pipe Flush <sup>5)</sup>             | Condair CE: Ext.Pipe Flush<br>0 = Closed<br>1 = Open                                                                                                                  |                           |         |        |
| Level Cyl. A                              | 0 = no level<br>1 = low<br>2 = low-mid<br>3 = mid<br>4 = mid-high<br>5 = high                                                                                         | 32029                     | 2028    |        |
| Level Cyl. B                              | 0 = no level<br>1 = low<br>2 = low-mid<br>3 = mid<br>4 = mid-high<br>5 = high                                                                                         | 32030                     | 2029    |        |
| Nominal Voltage                           | 0 = 200V<br>1 = 208V<br>2 = 230 V<br>3 = 240 V<br>4 = 380 V<br>5 = 400 V<br>6 = 415 V<br>7 = 440 V<br>8 = 460 V<br>9 = 480 V<br>10 = 500 V<br>11 = 550V<br>12 = 600 V | 32031                     | 2030    |        |

<sup>5)</sup> optional

| Name                                      | Range                          | Input Register<br>1-based | Address | Format       |
|-------------------------------------------|--------------------------------|---------------------------|---------|--------------|
| <i>Read with function 04</i>              |                                |                           |         |              |
| Max Hum. Capacity <sup>2)</sup>           | 5 - 160 kg/h<br>10 - 360 lb/hr | 32042                     | 2041    | 32-Bit Float |
| Max Hum. Capacity Cyl. A <sup>2)</sup>    | 5 - 40 kg/h<br>10 - 90 lb/hr   | 32044                     | 2043    |              |
| Max Hum. Capacity Cyl. B <sup>2)</sup>    | 5 - 40 kg/h<br>10 - 90 lb/hr   | 32046                     | 2045    |              |
| Actual Hum. Capacity <sup>2)</sup>        | 0 - 160 kg/h<br>0 - 360 lb/hr  | 32048                     | 2047    |              |
| Actual Hum. Capacity Cyl. A <sup>2)</sup> | 0 - 40 kg/h<br>0 - 90 lb/hr    | 32050                     | 2049    |              |
| Actual Hum. Capacity Cyl. B <sup>2)</sup> | 0 - 40 kg/h<br>0 - 90 lb/hr    | 32052                     | 2051    |              |
| Control CH1                               | 0 - 100%                       | 32054                     | 2053    |              |
| Control CH2                               | 0 - 100%                       | 32056                     | 2055    |              |
| System Demand                             | 0 - 100%                       | 32058                     | 2057    |              |
| Operating Hours                           | 0 - 1'200'000 h                | 32060                     | 2059    |              |
| Operating Hours Cyl. A                    | 0 - 1'200'000 h                | 32062                     | 2061    |              |
| Operating Hours Cyl. B                    | 0 - 1'200'000 h                | 32064                     | 2063    |              |
| Next Small Maintenance Cyl. A             | 0 - 6000 h                     | 32066                     | 2065    |              |
| Next Small Maintenance Cyl. B             | 0 - 6000 h                     | 32068                     | 2067    |              |
| Next Extended Maintenance Cyl. A          | 0 - 6000 h                     | 32070                     | 2069    |              |
| Next Extended Maintenance Cyl. B          | 0 - 6000 h                     | 32072                     | 2071    |              |

<sup>2)</sup> According to the settings <Imperial> or <Metric> in the RS controller software

| Name                                                   | Range                                                                                                                | Holding Register<br>1-based | Address | Format |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------|---------|--------|
| <b>Read with function 03 / Write with function 06</b>  |                                                                                                                      |                             |         |        |
| Setpoint CH1                                           | 5 - 95 %                                                                                                             | 43001                       | 3000    | UInt16 |
| Setpoint CH2                                           | 5 - 95 %                                                                                                             | 43002                       | 3001    |        |
| P-Band CH1                                             | 6 - 65 %                                                                                                             | 43003                       | 3002    |        |
| P-Band CH2                                             | 6 - 65 %                                                                                                             | 43004                       | 3003    |        |
| I-Time CH1                                             | 1 - 60 min                                                                                                           | 43005                       | 3004    |        |
| I-Time CH2                                             | 1 - 60 min                                                                                                           | 43006                       | 3005    |        |
| Capacity Limitation                                    | 20 - 100 %                                                                                                           | 43007                       | 3006    |        |
| Actual humidity or demand via Modbus CH1 <sup>3)</sup> | 0 - 100 %                                                                                                            | 43008                       | 3007    |        |
| Actual humidity or demand via Modbus CH2 <sup>7)</sup> | 0 - 100 %                                                                                                            | 43009                       | 3008    |        |
| Remote RS Drain                                        | Read:<br>100 = Off<br>0 - 99 = Progress draining in %<br>Write:<br>0 = Stop draining<br>1 = Start draining Cyl. A+ B | 45002                       | 5001    |        |
| Remote RS Drain Cyl. A                                 | Read:<br>100 = Off<br>0 - 99 = Progress draining in %<br>Write:<br>0 = Stop draining<br>1 = Start draining Cyl. A    | 45003                       | 5002    | UInt16 |
| Remote RS Drain Cyl. B                                 | Read:<br>100 = Off<br>0 - 99 = Progress draining in %<br>Write:<br>0 = Stop draining<br>1 = Start draining Cyl. B    | 45004                       | 5003    |        |

<sup>3)</sup> The register is only active if the parameters are configured according to [Section 6.1](#).

<sup>7)</sup> The register is only active if the parameters are configured according to [Section 6.1](#) and the dual signal control (supply air limitation) is activated.

## 7.4 Data register RO-E

| Name                                  | Range                                                                                                                                         | Input Register 1-based | Address | Format       |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------|--------------|
| <i>Read with function 04</i>          |                                                                                                                                               |                        |         |              |
| Error or Warning Code <sup>1)</sup>   | 0 = No Error                                                                                                                                  | 32004                  | 2003    | UInt16       |
| Fault Status                          | 0 = No Error<br>1 = Warning<br>2 = Error                                                                                                      | 32501                  | 2500    |              |
| Y11 Inlet valve                       | 0 = Closed<br>1 = Open                                                                                                                        | 32502                  | 2501    |              |
| Y12 Drain valve <sup>8)</sup>         | 0 = Open<br>1 = Closed                                                                                                                        | 32503                  | 2502    |              |
| Y13 Outlet valve <sup>5)</sup>        | 0 = Open<br>1 = Closed                                                                                                                        | 32504                  | 2503    |              |
| Y15 Permeate valve <sup>9)</sup>      | 0 = Drain<br>1 = Tank                                                                                                                         | 32505                  | 2504    |              |
| Y16 Concentrate valve <sup>5)</sup>   | 0 = Closed<br>1 = Open                                                                                                                        | 32506                  | 2505    |              |
| UO Type                               | 0 = RO-E<br>1 = RO-E+                                                                                                                         | 32507                  | 2506    |              |
| RO Status                             | 0 = Initializing<br>1 = Diagnostic<br>2 = Stopped<br>3 = Hold<br>4 = Filling<br>5 = Standby<br>6 = Flushing<br>7 = Draining                   | 32508                  | 2507    |              |
| UO Capacity <sup>2)</sup>             | 0 = 20 l/h / 5.3 gal/hr<br>1 = 40 l/h / 10.6 gal/hr<br>2 = 100 l/h / 26.4 gal/hr<br>3 = 200 l/h / 52.8 gal/hr<br>4 = 300 l/h / 79.3 gal/hr    | 32509                  | 2508    |              |
| UO Maintenance status                 | 0 = No Info<br>1 = Warning<br>2 = Warning Sys<br>3 = Warning Commissioning<br>4 = Warning Activation<br>5 = Error<br>6 = Warning Disinfection | 32511                  | 2510    |              |
| Inlet pressure <sup>2)</sup>          | 0 - 6 bar<br>0 - 87.0 psi                                                                                                                     | 32514                  | 2513    | 32-Bit Float |
| Tank pressure <sup>2)</sup>           | 0 - 6 bar<br>0 - 87.0 psi                                                                                                                     | 32516                  | 2515    |              |
| Membrane pressure <sup>2)</sup>       | 0 - 20 bar<br>0 - 290.0 psi                                                                                                                   | 32518                  | 2517    |              |
| Permeate conductivity <sup>8)</sup>   | 0 - 100 µS/cm                                                                                                                                 | 32520                  | 2519    |              |
| Permeate temperature <sup>2) 5)</sup> | 0 - 60 °C<br>32 - 140 °F                                                                                                                      | 32522                  | 2521    |              |
| Permeate flow <sup>2) 5)</sup>        | 0 - 400 l/h<br>0 - 106 gal/hr                                                                                                                 | 32524                  | 2523    |              |
| Next maintenance                      | 0 - 4000 h                                                                                                                                    | 32526                  | 2525    |              |
| Next Disinfection                     | 0 - 365 [Days]                                                                                                                                | 32528                  | 2527    | UInt16       |
| Operating hours                       | 0 - 1200000 h                                                                                                                                 | 32529                  | 2528    | 32-Bit Float |

<sup>1)</sup> Refer to malfunction list in the Condair RO-E operation manual for a description of the malfunction codes

<sup>2)</sup> According to the settings <Imperial> or <Metric> in the RO-E controller software

<sup>5)</sup> optional

<sup>8)</sup> RO-E optional, RO-E+ inclusive

<sup>9)</sup> nur RO-E+

| Name                                                  | Range                     | Holding Register<br>1-based | Address | Format       |
|-------------------------------------------------------|---------------------------|-----------------------------|---------|--------------|
| <i>Read with function 03 / Write with function 06</i> |                           |                             |         |              |
| Minimum tank pressure                                 | 0 - 5 bar<br>0 - 72.5 psi | 43501                       | 13500   | 32-Bit Float |
| Maximum tank pressure                                 | 0 - 5 bar<br>0 - 72.5 psi | 43503                       | 13502   |              |

## 7.5 Data register Vita

| Name                                  | Range                                                                                                                                                                                         | Input Register 1-based | Address   | Format       |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------|--------------|
| <b>Read with function 04</b>          |                                                                                                                                                                                               |                        |           |              |
| Number of Areas                       | 1-50                                                                                                                                                                                          | 32001                  | 2000      | UInt16       |
| Reverse Osmosis State <sup>1)</sup>   | 0 = Stopped<br>1 = Depressuring<br>2 = Empty<br>3 = Flushing<br>4 = Flushing no water<br>5 = Producing<br>6 = Holding<br>7 = Wait for pressure                                                | 32901                  | 2900      |              |
| Deionization State <sup>2)</sup>      | 0 = Syn_Idle<br>1 = Syn_Active                                                                                                                                                                | 32902                  | 2901      |              |
| Pressure Status HP Line <sup>3)</sup> | 0 = HP_Stopped<br>1 = HP_Flushing<br>2 = HP_Flushing no water<br>3 = HP_Producing<br>4 = HP_Producing no water<br>5 = HP_Holding<br>6 = HP_Depressuring<br>7 = HP_Empty<br>8 = HP_Ventilating | 32903                  | 2902      |              |
| Serial Number                         |                                                                                                                                                                                               | 32002                  | 2001      | UInt32       |
| Last UV Lamp Replacement              | in seconds since                                                                                                                                                                              | 32904                  | 2903      |              |
| Last Micro Filter Replacement         | in seconds since                                                                                                                                                                              | 32910                  | 2909      |              |
| Area State <sup>4)</sup>              | 0 = Warning<br>1 = Error<br>2 = Absent<br>3 = Inactive<br>4 = FWA<br>5 = Active                                                                                                               | 32501-32550            | 2500-2549 | UInt16       |
| Area Actual Temperature <sup>7)</sup> | 0 - 60 °C<br>32 - 140 °F                                                                                                                                                                      | 32651-32751            | 2650-2750 | 32-Bit Float |
| Actual Humidity Area                  | 0 - 100%                                                                                                                                                                                      | 32551-32650            | 2550-2649 |              |
| Error Flag                            | 0 = No errors and no warnings pending<br>1 = Errors pending<br>2 = Warnings pending<br>3 = Info pending                                                                                       | 32008                  | 2007      | UInt16       |
| Error Time                            | in seconds since                                                                                                                                                                              | 32004                  | 2003      | UInt32       |
| Error Code                            | 0x0000 to 0x7FFF                                                                                                                                                                              | 32006                  | 2005      | UInt16       |

| Name                         | Range                                                                                                                                                                                                                                                                                                                                                     | Input Register<br>1-based | Address | Format |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|--------|
| <b>Read with function 04</b> |                                                                                                                                                                                                                                                                                                                                                           |                           |         |        |
| Error Category <sup>5)</sup> | 0 = Fatal error system<br>1 = Fatal error hp-ring<br>2 = Error hp-ring (FWA -possible)<br>3 = Error w. impact on water quality<br>4 = Error (system partially down)<br>5 = Error (limited operation)<br>6 = Warning (action urgently needed)<br>7 = Warning (action may needed)<br>8 = Service due<br>9 = Service soon due<br>10 = no error <sup>8)</sup> | 32007                     | 2006    | UInt16 |
| System Viewer Error State    | 0 = no error<br>1 = warning<br>2 = error                                                                                                                                                                                                                                                                                                                  | 32009                     | 2008    | UInt16 |
| System Viewer Err Warn Code  | 0 = no error                                                                                                                                                                                                                                                                                                                                              | 32010                     | 2009    | UInt16 |

| Name                                                  | Range     | Holding Register<br>1-based | Address   | Format |
|-------------------------------------------------------|-----------|-----------------------------|-----------|--------|
| <b>Read with function 03 / Write with function 06</b> |           |                             |           |        |
| Area Setpoint <sup>6)</sup>                           | 20 - 100% | 43501-43550                 | 3500-3549 | UInt16 |

- <sup>1)</sup> 0 = Stopped (Reverse osmosis stage is stopped)  
 1 = Depressurizing (the product water tank is emptied.)  
 2 = Empty (the product water tank is empty)  
 3 = Flushing (the reverse osmosis stage is being flushed)  
 4 = Flushing no water (the supply water pressure too low <1.3 bar)  
 5 = Producing (the product water tank is being filled)  
 6 = Hold (the reverse osmosis stage is in standby mode)  
 7 = Wait for pressure (the system is waiting for pressure)

- <sup>2)</sup> 0 = Idle (no additive (CO<sub>2</sub>) is added)  
 1 = Active (Additive (CO<sub>2</sub>) is dosed accordingly)  
<sup>3)</sup> 0 = Stopped (the high-pressure stage is stopped)  
 1 = Flushing (the high-pressure line is being flushed)  
 2 = Flushing no water (Water supply pressure of the high-pressure stage too low)  
 3 = Producing (the high-pressure stage is active; the high-pressure line is regulated to 70 bar)  
 4 = Producing no water (Water supply pressure of the high-pressure stage too low)  
 5 = Hold (the high-pressure stage is in standby mode)  
 6 = Depressurizing (The high-pressure line is emptied)  
 7 = Empty (the high-pressure line is empty)  
 8 = Venting (High-pressure pump is being vented)

- <sup>4)</sup> 0 = Warning (The area is in warning state)  
 1 = Error (the area is in error state)  
 2 = Absent (the area is manually deactivated, hygiene functions are still active)  
 3 = Inactive (the nebulizers in this area are deactivated)  
 4 = FWA (fresh water automatic system of the zone is active (hygiene function))  
 5 = Active (the nebulizers in this area are deactivated)

<sup>5)</sup> When evaluating error messages, the error category should be taken into account. Otherwise, unnecessary warning messages may occur. We recommend only evaluating errors via the building management system (BMS) that require mandatory user intervention. This is the case from (and including) error category 7 onwards.

<sup>6)</sup> **CAUTION:** Incorrectly set target values or incorrectly transmitted or recorded sensor values can cause water damage. The operator of the system is responsible for continuously monitoring the accuracy of these values!

<sup>7)</sup> According to the settings <Imperial> or <Metric> in the Vita controller software.

<sup>8)</sup> The System Master error category "10 = no error" is supported from software version 3.2.0 onwards.



## 8 Test of the Modbus communication

Best is to check the Modbus communication in advance with a "Modbus Test Tool". For the tests, this software is taking the function of the master station or of a client with Modbus TCP.

Unlike other bus systems, Modbus is having a lot of providers for such test tools. The handling of these test tools is varying from producer to producer and cannot be described generally. However it's possible to sum up some similarities, how test tools are working and what needs to be entered.

### 8.1 Modbus RTU Test

- **Communication Gateway (Communications Port)**

This Port is used for the serial communication between the Integrated Controller and a notebook or a PC, respectively. At Windows this information is given at the Windows Device Manager. The shown port for the communication has to match with the setting of the test tool.

- **Baud Rate**

The baud rate has to be set to the same value as the baud rate at the Integrated Controller (default value ex-factory = 19200 baud). It's possible to change the baud rates, however they always have to be equal at the Integrated Controller and at the test tool.

- **Quantity of Data Bits**

The number of data bits at the Integrated Controller is 8 and cannot be changed. The test tool must be adjusted to the default setting of the respective Integrated Controller.

- **Quantity of Stop Bits**

The number of stop bits at the Integrated Controller cannot be changed as well. There is always 1 stop bit used. The used stop bits have to be set at the test tool to value 1.

- **Parity**

The the parity of the Integrated Controller is set ex-factory to "Even". The value can be adjusted. The test tool has to show the same parity like the Integrated Controller.

- **Modus protocol type**

Most Modbus Master test tools are supporting the Modbus RTU telegram and the Modbus TCP or even Modbus ASCII. Please make sure, that the modus is set on "RTU".

- **Entry of the Modbus Address**

The Modbus address at the Integrated Controller is set ex-factory to 10. This address can be adjusted from 1 to 247, however the value at the respective Integrated Controller and the one at the test tool have to be equal.

## 8.2 Modbus TCP Test

For the Modbus TCP test, less parameters need to be adjusted. However, it is important that the notebook and the Integrated Controller are in the same IP range. Therefore, assign a fixed IP address to the notebook in the network settings.

For the test, the notebook can be assigned to the same IP address range or you can use the following default settings for notebook and Integrated Controller:

- Notebook:
  - IP Address: 192.168.168.242
  - Subnet mask: 255.255.255.0
  - Subnet mask: 192.168.168.101
- Integrated Controller:
  - IP Address: 192.168.168.243
  - Subnet mask: 255.255.255.0
  - Standard gateway: 192.168.168.101

Note: The IP settings in the Integrated Controller and in the notebook must be reset to the original values after the test!

For the test of the Modbus TCP communication, the following additional parameters must be set in the test tool:

- **Modbus Protocol type**  
The protocol type must be set to Modbus TCP.
- **IP Address of the Integrated Controller**  
According to the selected setting in the communication menu (see [Section 5.3](#))
- **Modbus TCP Port**  
According to the Modbus TCP standard the default port is 502.  
The port number may be set to a different value. It is important that the port number in the Modbus TCP settings of the Integrated Controller is the same as the one in the test tool.
- **Modbus Address**  
Imperatively set the Modbus address to 255 if this input is required in the test tool.  
**Caution:** The Modbus address (alias Node ID, Slave ID, device address) must not be confused with the IP address.

## 8.3 Read out registers

The entry of the readable or the writable register is often generating problems. Therefore, please observe the following notes

- The first figure from the left shows the type of register. The Integrated Controller is using "Holding Register" 4 and "Input Register" 3 only.
- The remaining figures are showing the number. Particular at the Modbus telegram is, that the numbering of the registers is not matching with the addressing. The listing of the numbering starts with 1 (1-based), the listing of the addressing with 0 (0-based).

That means, register 43004 has the address 3003 and the number 3004.

- Example Register 43004  
4 = Register type (4 = Holding Register)  
3004 = Number (or Address 1-based)  
3003 = Address
- Example Register 32003  
3 = Register type (3 = Input Register)  
2003 = Number (or Address 1-based)  
2002 = Address

**It is therefore important to take notice whether the register, the number or the address must be entered in the test tool used.**

**Note:** The format described above describes the register specifications according to the Modicon 5-digit standard. All registers described in this manual use this type of register.

## 8.4 Function

In order to be able to read out the value from the Modbus register, there are usually two different input variants, which differ depending on the test tool used:

- **Version 1:**

**Entry of the function + entry of the address or number**

With this type, you first enter the function in a single field and the address or number in a second input field. Which function fits to which register is best taken from the tab tables.

e.g. Function 03 + number 3004 = **43004**

Please note that holding registers are read with function 03, although for holding registers the first digit from the left is **4**!

The other way round input registers, which start with 3, are read with the function 4.

- **Version 2a:**

- Entry of the register e.g. 43003 and a negative offset**

- Register 43003 + Offset of -40001 results in address 3002

- Register 43004 + Offset of -40000 results in address 3004

- Register 32003 + Offset of -30001 results in address 2002

- Register 32003 + Offset of -30000 results in address 2003

- **Version 2b:**

- Selection of the register type 4 and a positive offset**

- Register type 4 + Offset of +3004 results in the register 43004.

## 8.5 Number of registers

For most of the test tools it's possible to enter the number of registers in an additional field after the selection of the first register. If for example for the first register 43004 is entered and under number of registers 3, the data will be read from the registers 43004, 43005, 43006.

This procedure is very comfortable, as it's not necessary to enter each address separately, however it bears the risk of errors.

If for example the register 43006 is missing, or if it's blocked by Condair, the test tool is displaying an error! It's advisable to first check separate registers and afterwards to look for connected register ranges. General rule: Each readable register has to be part of the register table of the respective device.

## 8.6 32-Bit Float Register

Here it must be considered, that for the transfer of 32-bit float values always two consecutive registers have to be transmitted, as one register has 16 bit only.

In order to transmit a 32-bit float value, for example the operating hours of the DL, the registers 32032 and 32033 are required.

Note: For some test tools the "Number of registers" must be set to 2 in order to read out 32-bit float registers.

## 8.7 Test tool variety

The variants shown above are not final, but are covering a big amount of test tools, which are available on the market. If you should need any further information regarding test tools, **please read first the operating instructions of the used test tool.**

A detailed description for a test tool is available from Condair Group AG. Unfortunately we're not allowed to publish pictures of all test tool manufacturers. Therefore we concentrate on a commercial test tool, which is available online and which is fulfilling the requirements for the test of the communication with the Integrated Controller.

If required, ask for the additional operating instructions. These describe in detail the use of the test tool "Modbus Poll".

Notes

Notes



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