

**READ AND SAVE THESE INSTRUCTIONS**

# BASIC-PLC CONTROLLER MANUAL

For all Condair desiccant dryer with equipped with Basic-PLC valid from version: PLC-35/PLC-45 18.04.03

# Thank you for choosing Condair

Installation date (MM/DD/YYYY):

Commissioning date (MM/DD/YYYY):

Site:

Model:

Serial number:

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# 1 Introduction

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## 1.1 To the very beginning

We thank you for having purchased a **Condair DA desiccant dryer with Basic PLC controller**.

The Condair DA desiccant dryers incorporate the latest technical advances and meets all recognized safety standards. Nevertheless, improper configuration and use of the Condair DA desiccant dryer with Basic PLC controller may result in danger to the user or third parties and/or damage to property.

To ensure a safe, proper, and economical operation of the Condair DA desiccant dryer, please observe and comply with all information and safety instructions contained in the present manual as well as in the separate documentations of the components installed in the drying system.

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

## 1.2 Notes on this manual

### Limitation

**The subject of this manual is the Basic PLC controller which is us together with the Condair DA desiccant dryers and is meant for well-trained personnel being sufficiently qualified for their respective work.**

### Safekeeping

Please safeguard this manual in a safe place, where it can be immediately accessed. If the desiccant dryer changes hands, the manual must be passed on to the new operator.

If the manual gets misplaced, please contact your Condair representative.

### Language versions

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

## 2 For your safety

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### General

Every person working with the Basic PLC control of the Condair DA desiccant dryer must have read and understood this PLC controller manual as well as the installation and operation manual of the corresponding Condair DA desiccant dryer before carrying out any work.

Knowing and understanding the contents of this PLC controller manual and Condair DA desiccant dryer installation and operation manual 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.

### Qualification of personnel

All operations described in this PLC controller manual **may only be carried out by specialist who are well trained and adequately qualified and are authorized by the customer.**

For safety and warranty reasons any action beyond the scope of this manual must be carried out only by qualified personnel authorised by the manufacturer.

It is assumed that all persons working with the Condair DA desiccant dryer are familiar and comply with the appropriate regulations on work safety and the prevention of accidents.

The Condair DA desiccant dryer may not be used by persons (including children) with reduced physical, sensory or mental abilities or persons with lacking experience and/or knowledge, unless they are supervised by a person responsible for their safety or they received instructions on how to operate the system. Children must be supervised to make sure that they do not play with the Condair DA desiccant dryer.

### Intended use

The Basic PLC controller is intended exclusively to control the Condair DA desiccant dryers. Any other type of application, without the written consent of Condair, is considered as not conforming with the intended purpose and may lead to the Condair DA desiccant dryer becoming dangerous.

Operation of the equipment in the intended manner requires **that all the information contained in this installation and operation manual are observed (in particular the safety instructions).**

### Prohibited modifications to the unit

**No modifications must be undertaken** on the Basic PLC controller without the express written consent of Condair.

## 3 Basic-PLC controller

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The Condair desiccant dryers can be fitted with our new PLC controller.

The control configuration Basic-PLC is equipped with a 3.5" integrated 16-bit color touchscreen and rated IP66.

It contains functions to control the desiccant dryer, runtime meters and alarm functions.

The reactivation fan has a delayed runtime of 5 minutes to cool the heaters down after dehumidification.

Control functions also include rotation guard for the rotor and dehumidification control using an external 0-10V humidity sensor or a 0-10V control signal.

## 4 Displays

The Basic-PLC controller has different displays as described on the following pages.

The LCD display automatically turns off after 60 seconds. The display turns on again at touch. In case of an alarm, the display remains turned on.

### 4.1 Main page

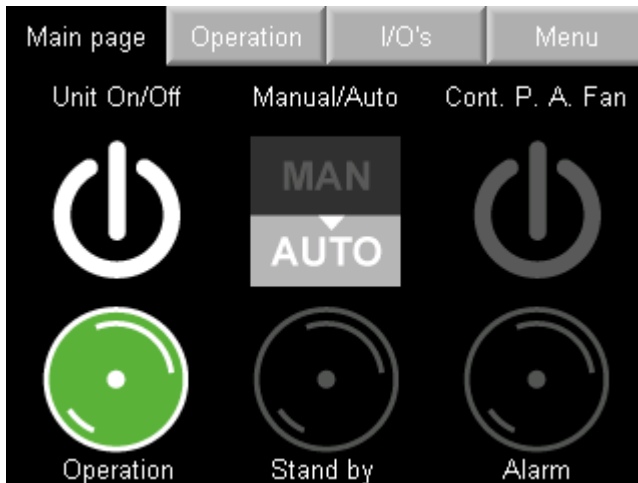
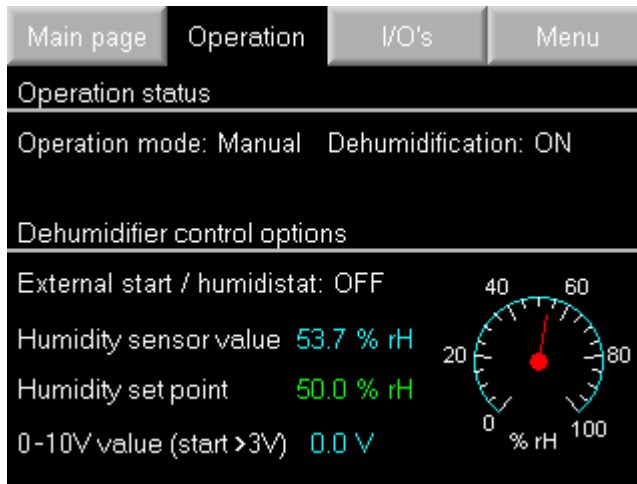


Fig. 1: Main display

The main page contains three buttons and three indication lights.

- Buttons
  - **<Unit On/Off>** button.  
Turns the unit on and off.
  - **<Manual/Auto>** button.  
In manual mode the unit runs continuously and in automatic mode the unit is run with humidity control or an external on/off signal.
  - **<Cont. P. A. Fan>** button (**Continuous Process Air Fan**).  
In automatic mode, the process air fan can run continuously by pressing **<Cont. P. A. Fan>**. The air circulation is maintained, even if no dehumidification is required.
- Indication lights
  - **Operation** indicator light.  
The operation indication light turns green when the unit is turned on and dehumidification is active.
  - **Stand by** indicator light.  
The stand by indication light is orange as long as dehumidification is inactive.
  - **Alarm** indicator light.  
If an alarm is active, the alarm indicator turns red and it will be turned on until the alarm has been acknowledged and reset.

## 4.2 Operation



*Fig. 2: Operation display*

The operation page shows the operation status of the Condair DA desiccant dryer. Available control options are also shown here:

- On/Off control
- humidity control using an optional humidity sensor
- humidity control using an external 0-10V control signal.

If the correct type of sensor is connected, dehumidification starts when the humidity is higher than the humidity set point which is 50 %rh as default.

If no sensor is connected, the humidity value is "0 %rh".

A 0-10V signal of an external humidity controller can also be used for dehumidification control. Dehumidification will start when the control signal rises above 3 V. Above 5 V the second reactivation heating stage is activated. If the reactivation air fan is of EC type, it can be speed controlled between 3-10V. Otherwise it will run with full speed.



### 4.3 I/O display

Main page	Operation	I/O's	Menu
Digital inputs		Digital outputs	
<input type="checkbox"/>	Rotation guard	1	React. heater step 1
<input type="checkbox"/>	React. heater fault	1	React. heater step 2
<input type="checkbox"/>	Process air fan fault	1	Process air fan
<input type="checkbox"/>	React. air fan fault	1	React. air fan
<input type="checkbox"/>	Drive motor fault	1	Rotor drive motor
<input type="checkbox"/>	P.a. fan thermal	0	Ext. alarm indication
<input type="checkbox"/>	Filter guard		
<input type="checkbox"/>	Ext. start/humidistat		
<input type="checkbox"/>	Ext. emergency stop		
<input type="checkbox"/>	React. air fan thermal		

Fig. 3: Status display digital inputs and outputs

The input/output page gives information about the digital inputs and outputs in the PLC controller. It shows the current I/O status.

Some I/O's are different depending on unit size and version.

### 4.4 Menu access

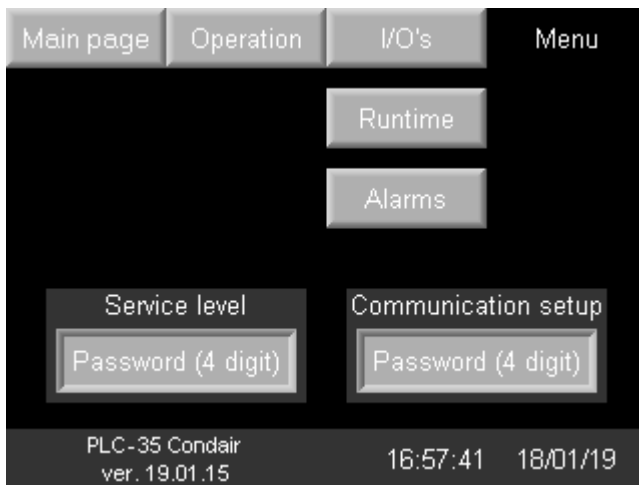


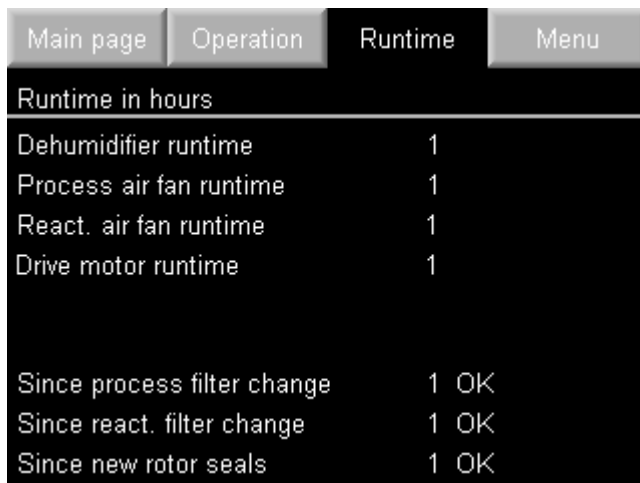
Fig. 4: Menu access display

The menu display contains links to the "Runtime" and "Alarms" submenus as well as all to the password protected submenus "Service level" and "Communication setup".

- "Service level" password: "1111".
- "Communication setup" password: "4498".

The software version number, time and date is displayed here as well.

## 4.5 Runtime submenu



Main page	Operation	Runtime	Menu
Runtime in hours			
Dehumidifier runtime		1	
Process air fan runtime		1	
React. air fan runtime		1	
Drive motor runtime		1	
Since process filter change		1	OK
Since react. filter change		1	OK
Since new rotor seals		1	OK

*Fig. 5: Runtime submenu*

The runtime submenu shows runtime in hours for:

- Total desiccant dryer runtime
- Process/dry air fan runtime
- Reactivation/wet air fan runtime
- Drive motor runtime

There are also runtime meters that indicates runtime in hours since:

- Process air filter change.
- Reactivation air filter change.
- Rotor seals change.

The three last runtime meters can be reset in the "Service level" submenu (password protected level).

## 4.6 Alarms submenu

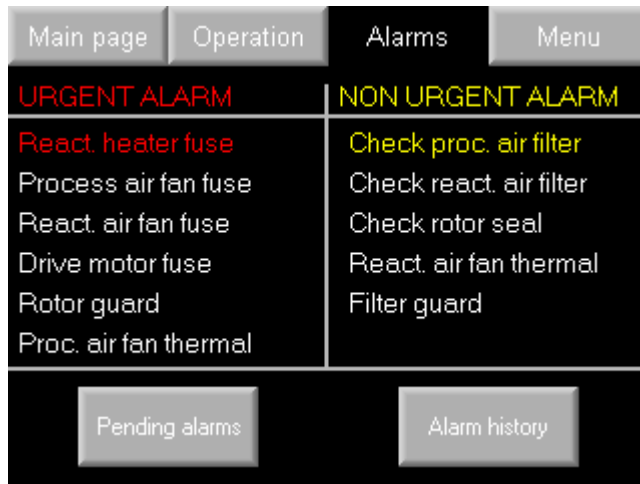


Fig. 6: Alarms submenu

The alarms page shows alarm status in two groups:

- **Urgent** alarms. These are:
  - Fault reactivation air heater
  - Fault Process/dry air fan
  - Fault Reactivation/wet air fan
  - Fault Drive motor
  - High temperature limit OH2 (when available)
  - Reactivation air fan thermal protection (when available)
  - Rotor guard (when available, Standard for DA 500 – DA 9400 units with PLC)
- **Non urgent** alarms. These are:
  - Check process air filter
  - Check reactivation air filter
  - Check rotor seals
  - Reactivation air temperature thermostat OH1 (stops the reactivation heaters when active)

When an alarm is active, it is indicated by the red and/or the yellow light. If an alarm is not active it is shown in gray.

The button **<Pending alarms>** opens a page showing all alarms that are pending. The button **<Alarm history>** opens a page showing the alarm history.

If an urgent alarm occurs, the unit will stop running. The unit can be restarted, but without the functions connected to the cause for the alarm. The alarm will remain active until the cause of the alarm has been taken care of. A non-urgent alarm will not stop the unit.

The rotation guard (if applicable) stops the unit when activated. The unit can be turned on again, but the reactivation heater will be deactivated until the magnet on the rotor passes by the rotation guard sensor. The magnet must pass the sensor within 45 minutes or there will be an alarm.

## Pending alarms

After pressing the **<Pending alarms>** button, the display of pending alarms grouped by category appears (see [Fig. 7](#)).

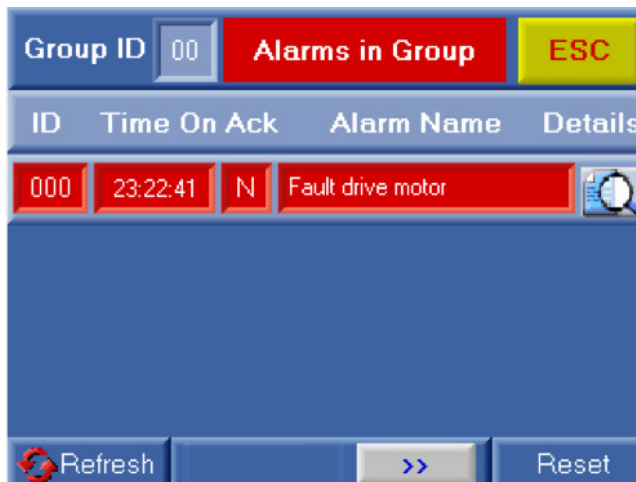


*Fig. 7: Pending alarms display*

With the **<Reset>** button you can reset alarms, if the cause of the problem has been solved.

With the **<Refresh>** button you can update the alarm list.

By pressing the magnifying glass button beside a pending alarm group, the alarms of the respective group are listed (see [Fig. 8](#)).



*Fig. 8: List of alarms of the selected group*

The column **"Ack"** (acknowledge) indicates whether the respective alarm was acknowledged ("Y") or not ("N").

By pressing the magnifying glass button in this display, further details of the respective alarm are displayed (see [Fig. 9](#)).



Fig. 9: Alarm details

By pressing the **<Ack>** button in this display, you acknowledge an alarm, which allows to reset the alarm if the cause is resolved.

### Alarm History

By pressing the **<Alarm history>** button in the "Alarms" submenu (see [Fig. 6](#)), a list of all alarms that have occurred is displayed.



Fig. 10: Alarm History

In the alarm history list for each alarm in the list the time is shown, when it occurred, when it was fixed, the elapsed time until it was acknowledged and the time when it was reset.

## 4.7 Service Level

On the first page of the "Service Level" submenu (password protected) are **<Reset>** buttons for all runtime meters.

Here you can reset the runtime meter after replacing filters or rotor seals or if a fan or motor has been replaced.

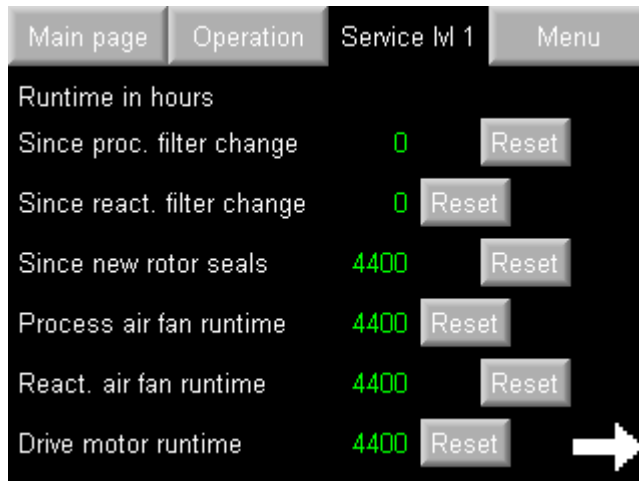


Fig. 11: Service Level page 1

On the second page of the "Service Level" submenu (password protected) the interval settings for filter and rotor seals replacement alarm can be adjusted.

The **<Rotation guard>** button activates or deactivates the rotor rotation guard.

With the **<Clear alarm history>** button the alarm history can be reset.

The PID-controller settings are for desiccant dryer control using a humidity sensor and should not be changed. P-band is the range above and below the humidity set point. I-time control the speed of the controller. PID output show the dehumidification demand 0-100. The unit start above 30 and stop at 0.

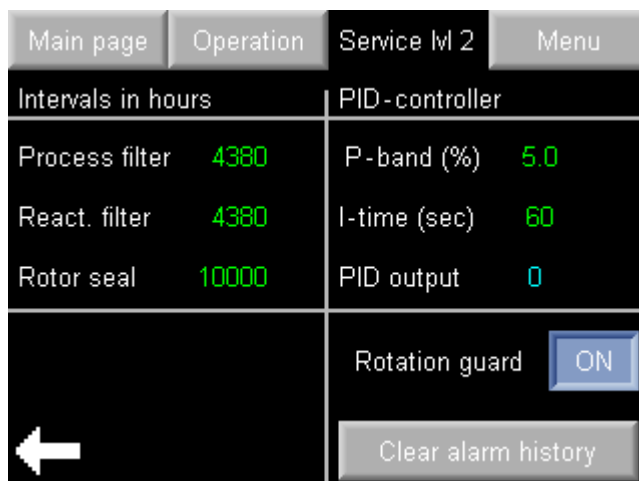


Fig. 12: Service Level page 2

## 4.8 Communication setup

In the "Communication setup" submenu (password protected) you can adjust the communication settings when using a communication card for Modbus R485 or TCP/IP.

- For RS485 there are six different combinations available to choose from.
- For TCP/IP it is possible to change IP address, gateway and subnet.

After adjusting a communication setting, press the corresponding save button **<Save RS485>** or **<Save TCP/IP>**, in order to save the adjusted settings. The Modbus network ID can also be set (default is "35").

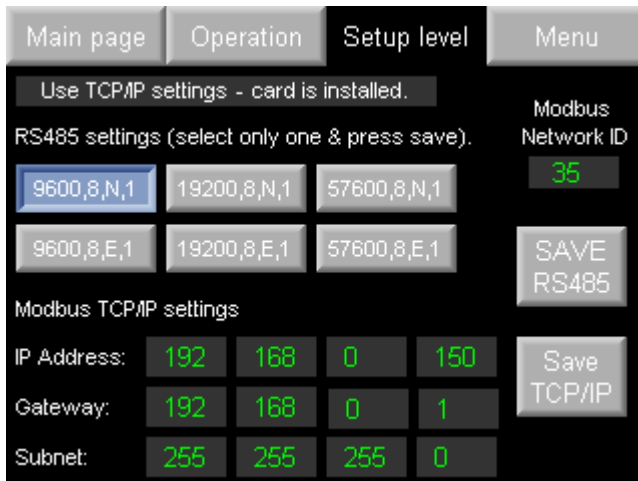


Fig. 13: Communication settings

## 5 Communication

The PLC has built in support for Modbus RTU with RS-232 interface.

Support for Modbus RTU RS485 and TCP/IP can be added with an optional communication card.

### 5.1 Modbus data register table

Modbus datapoint table				RS232, ID: 35, Baud rate: 9600, Parity: None, Stop bits: 1					
Holding Register	Coil Status	Read/Write	INFO	Text / Info	Var.	MBA	MBE	Format	
				<b>Analog inputs</b>					
70		R		Humidity sensor	%rh	0.0	100.0	###.#	
76		R		0-10V dehumidification control	VDC	0.0	10.0	###.#	
				<b>Analog setpoint</b>					
9		R/W		Humidity setpoint for humidity sensor	%rh	50.0	-	##.0	
				<b>Misc</b>					
	2	R/W	1=On	Unit on/off	1/0	-	-	-	
	3	R	1=On	Urgent alarm	1/0	-	-	-	
	4	R	1=On	Non urgent alarm	1/0	-	-	-	
	13	R/W	1=On	Cooling time react. Air fan	1/0	-	-	-	
	15	R/W	1=Auto	Unit automatic/manual mode	1/0	-	-	-	
	27	R/W	1=On	Continuous process air fan	1/0	-	-	-	
				<b>Digital inputs (Read)</b>					
	24576	R	1=On	Rotation guard sensor	1/0	-	-	-	
	24577	R	1=On	Circuit breaker, react. Heater	1/0	-	-	-	
	24578	R	1=On	Circuit breaker, process air fan	1/0	-	-	-	
	24579	R	1=On	Circuit breaker, react. Air fan	1/0	-	-	-	
	24580	R	1=On	Circuit breaker, drive motor	1/0	-	-	-	
	24581	R	0=On	Thermal prot. Proc. air fan (1300-3500 only) High temperature limit, OH2 (from size DT-4500)	1/0	-	-	-	
	24582	R	1=On	Filter guard (option)	1/0	-	-	-	
	24583	R	1=On	External start/Humidistat	1/0	-	-	-	
	24584	R	0=On	External emergency stop / fire alarm	1/0	-	-	-	
	24585	R	0=On	Thermal protection, react. air fan / React.air temp. thermostat OH1 (from DT-4500)	1/0	-	-	-	
				<b>Digital outputs (Read)</b>					
	16384	R	1=On	React. Heater step 1	1/0	-	-	-	
	16385	R	1=On	Process air/Dry air fan	1/0	-	-	-	
	16386	R	1=On	React. air/Wet air fan	1/0	-	-	-	
	16387	R	1=On	Drive motor	1/0	-	-	-	
	16388	R	1=On	Alarm indication (urgent + non urgent alarms)	1/0	-	-	-	
	16389	R	1=On	React. Heater step 2	1/0	-	-	-	
	16391	R	1=On	React. Heater step 3 (from DT-4500)	1/0	-	-	-	



Pin #	RS232 (Port 1)
1	Not connected
2	0V reference
3	TXD Signal
4	RXD Signal
5	0V reference
6	Not connected

Signals are related to the controller's 0V; the same 0V is used by the power supply.

The serial port is not isolated. If the controller is used with a non-isolated external device, avoid potential voltage that exceeds  $\pm 10V$ .

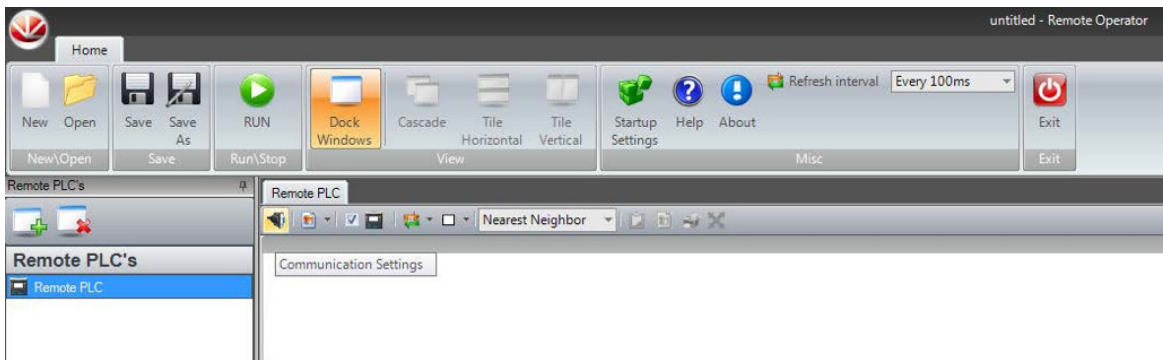
# 6 Remote operator

The "Remote Operator" software enables you to use a PC to view and work with a remote controller's HMI panel.

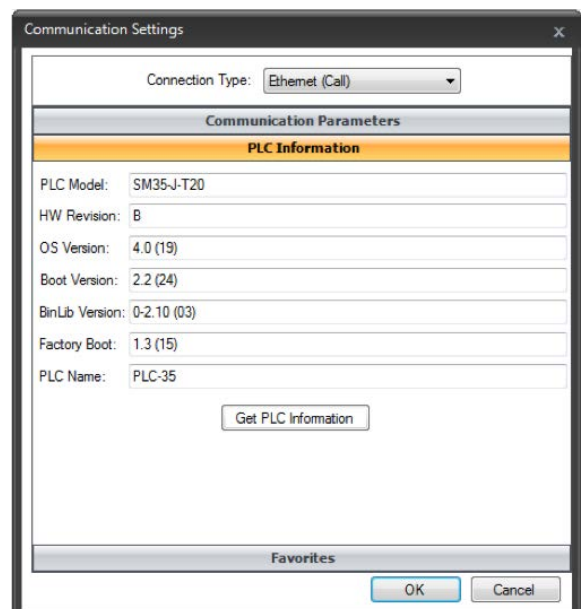
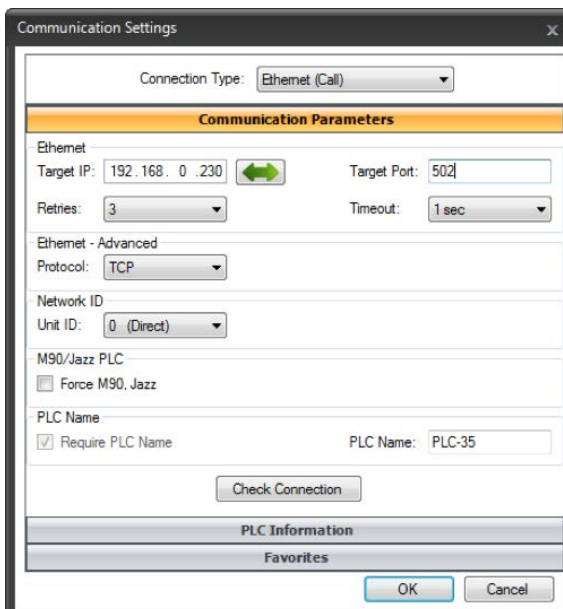
The Remote Operator software can be downloaded from the PLC's-manufacturer website (<http://uniconicsplc.com/software-visilogic/>).

## 6.1 Software configuration

- Press "Communication Settings" to set up communication with the PLC.

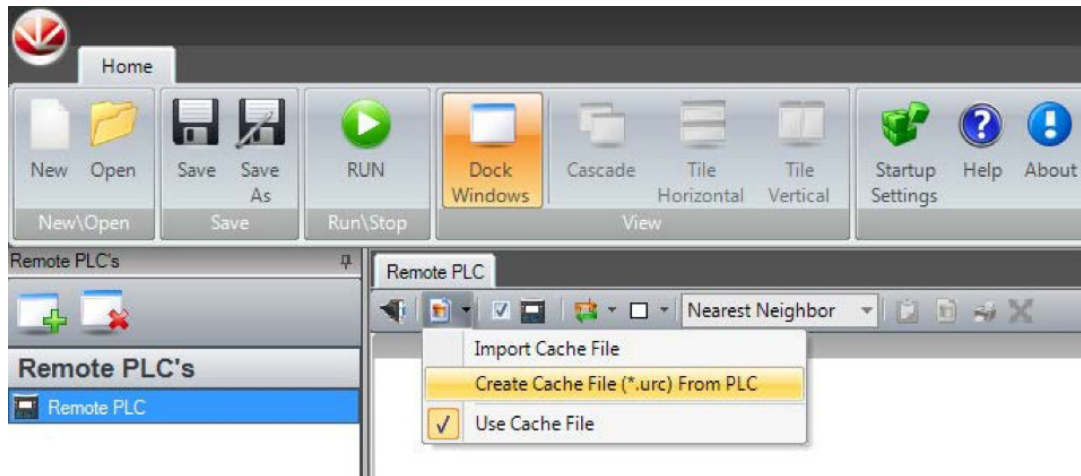


- Enter the communication parameters.  
The PLC name is **PLC-35** for unit sizes DA 500 up to DA 4000 and **PLC-45** for unit sizes from DA 4400.

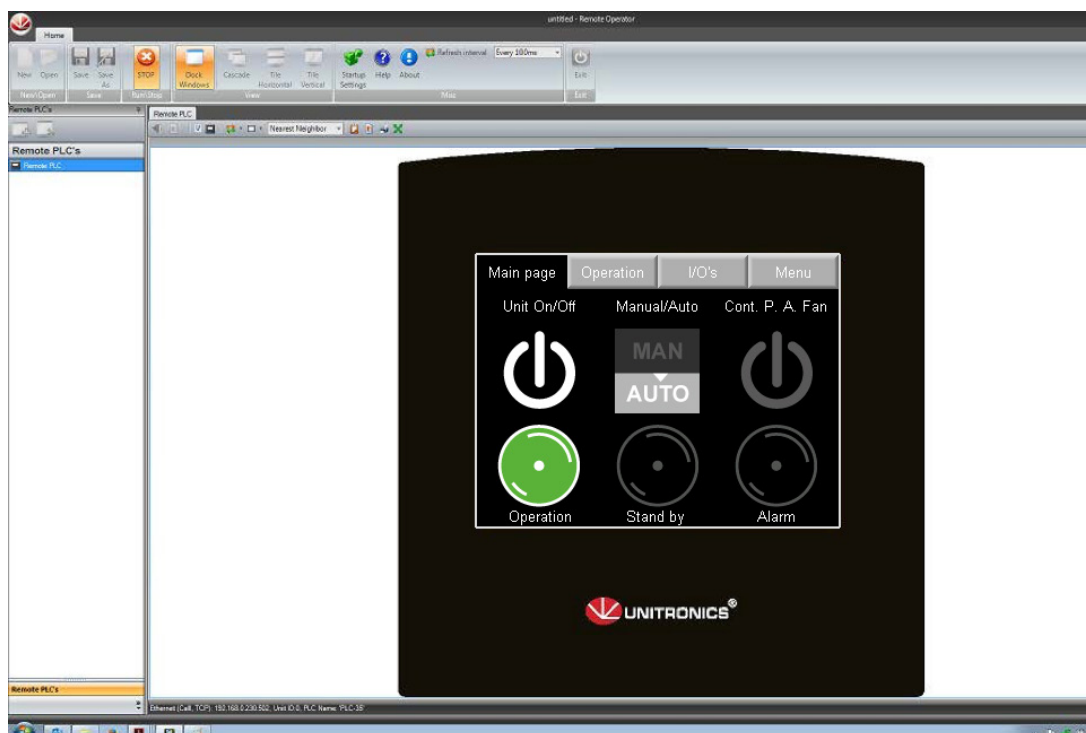


Press **<Check Connection>** and if the parameters are correct, the PLC information will be shown. Press **<OK>** to confirm.

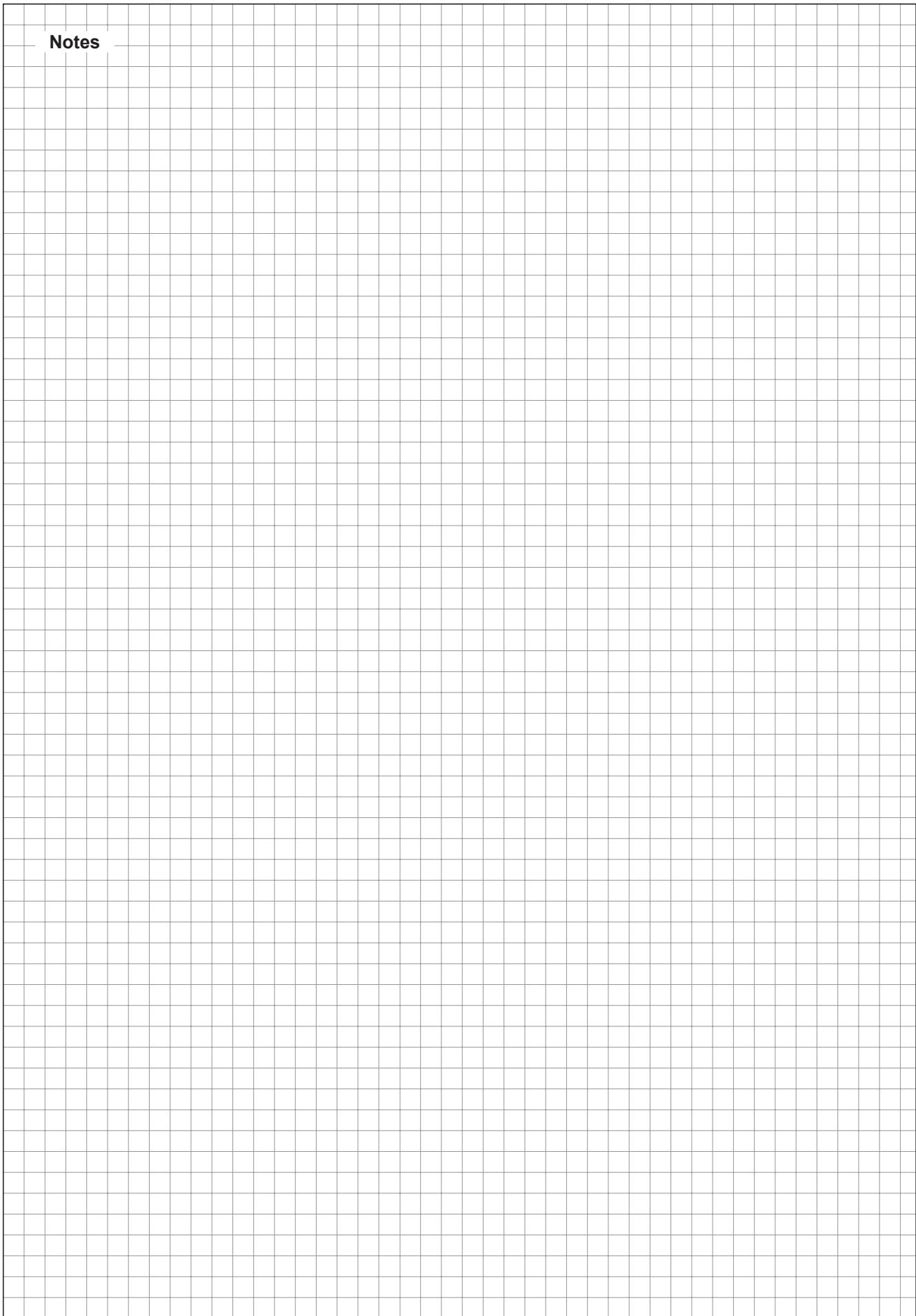
- When the PC has a connection to the PLC, a cache file must be created for the HMI. Press **<Create Cache File (\* .urc) From PLC>**. Choose a file name and press Next a few times. A cache file is created.



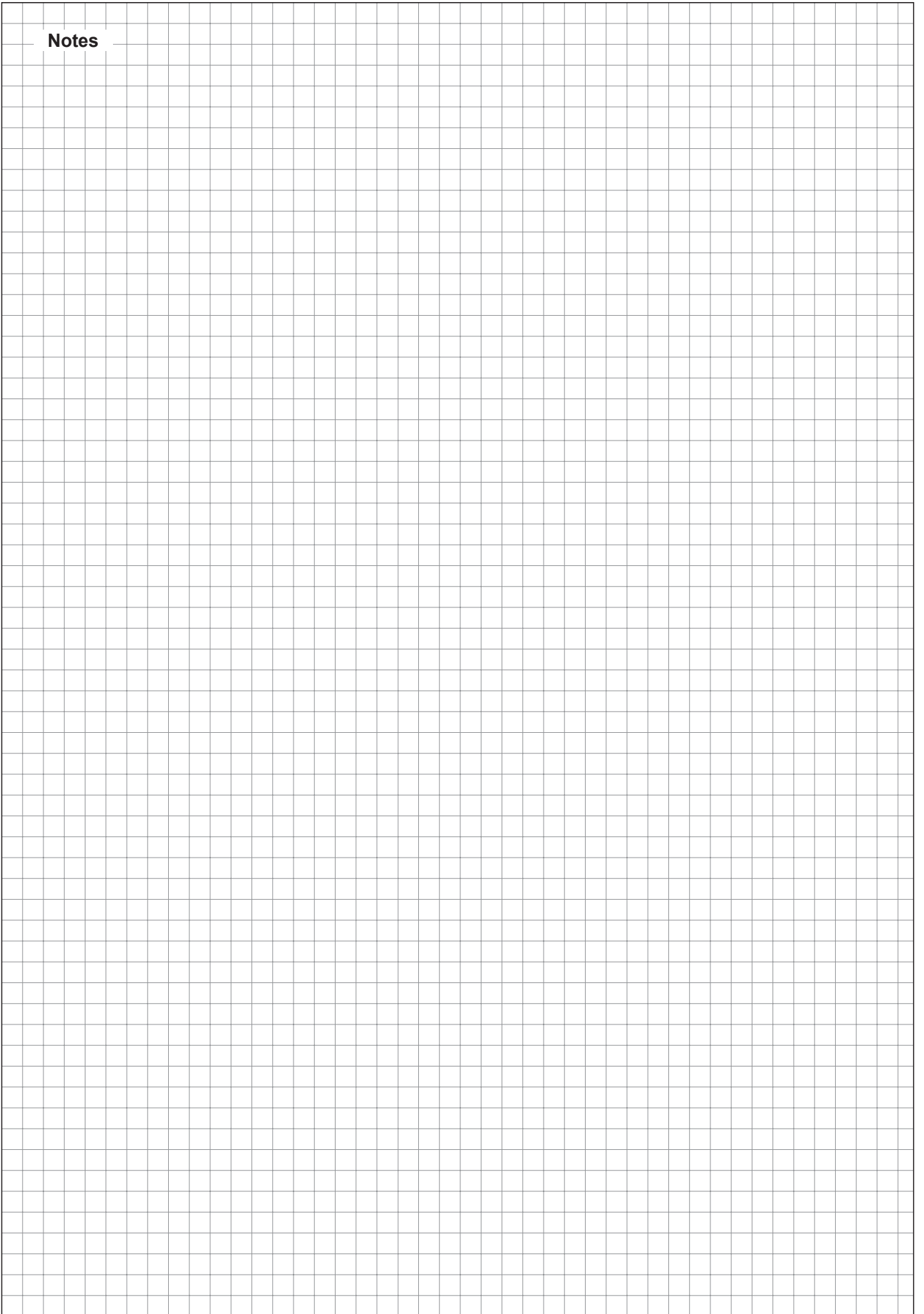
- Now, a live connection can be established. To start the remote operation, press **<RUN>**. The PLC can now be operated remotely.



Notes



**Notes**



Notes



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The Condair logo consists of a stylized graphic of three wavy lines on the left, followed by the word 'condair' in a bold, lowercase, sans-serif font.