

OC994 OVEN CONTROLLER USER GUIDE



ORDEL



Read this user manual carefully before using the device.

Responsibility for accidents and damages caused by non-compliance with the warnings in this manual belongs to the user.

Take precautions to prevent accidents and damages that may occur in case of malfunction of the device.

Do not use the device in environments with easily flammable and explosive gases.

Take precautions to prevent liquid substances and metal parts from entering the device.

Do not touch the terminals while the device is energized.

In case of malfunctions caused by usage errors, the device is out of warranty.

Do not energize the device before making the connections related to the device in accordance with the connection diagram.

The device should be used within the usage limits specified in this user manual.

Sensor and signal cables should not be close to high current and voltage power cables.

The life of the device as determined and announced by the ministry is 10 years.

Device settings should be made in accordance with the place and conditions of use.

OC994 Model devices are reliable devices designed for applications where four Temperature-control and Timing operations must be carried out together, in standard 96x96mm dimensions, manufactured with high technology, compatible with international standards.

It offers ON/OFF control, high sensitivity and stability, wide alternative hardware options, multi-purpose programmability and easy use.

Thanks to the Universal Power-Supply, it can be used with any power source.

OC994 - / 0 /

Supply voltage :

0 = 100-240Vac/dc (Universal)

1 = 24Vac/dc

Communication Module:

0 = None

3 = RS485 (MODBUS) Communication Module

Analog Output Module (O1) :

0 = None

1 = 0/4-20mA Current Output

2 = 0/2-10 Vdc Voltage Output

R1,R2 Output Module:

0 = None

1 = NO Contact

2 = 24V Logic Output (for driving SSR)

3 = NO/NC Contact

R3,R4 Output Module:

0 = None

1 = NO Contact

2 = 24V Logic Output (for driving SSR)

R5 Steam, R6 Horn Output Module:

0 = None

1 = NO Contact

2 = 24V Logic Output (for driving SSR)

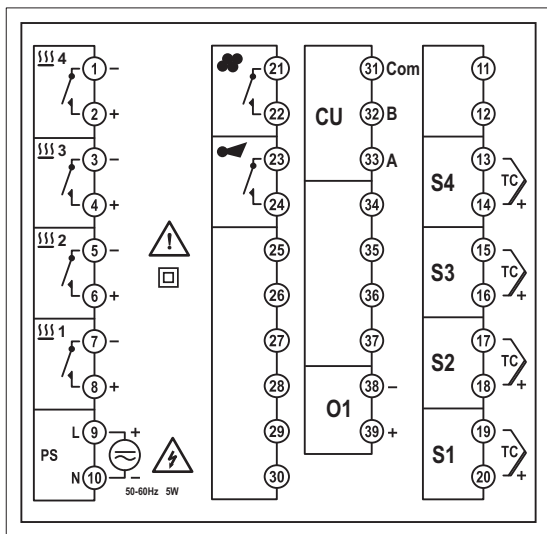
Note: If the R1 relay is coded as 3 (NO/NC), the R2 relay is used as a contact.

When selected, it should be coded as NO/NC.

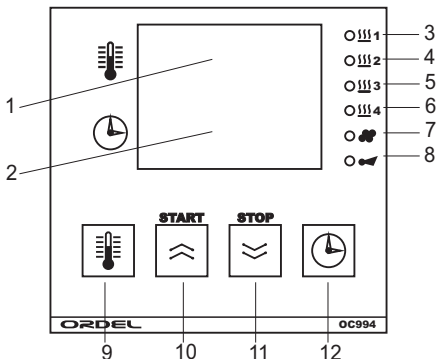
If R2 relay is coded as 3 (NO/NC), R1 relay is used as a contact.







When selected, it should be coded as NO/NC.

If R1,R2 module is selected as 3, R4 module should be coded as 0.



Supply voltage	100-240Vac/dc: +%10 -%15	24Vac/dc: +%10 -%20
Power consumption	4W,6VA	
Analog Input (S1)	Thermocouple (B,E,J,K,L,N,R,S,T,U)	
Analog Input Impedance	Thermocouple : 10MΩ	
Analog Output (O1)	Current: 0/4-20mA, 20-4/0mA(RL ≤	Voltage: 0/2-10V, 10-2/0V (RL ≥ 1MΩ
Digital Outputs (R1,R2)	NO Kontak: 250Vac 3A	NC Kontak: 250Vac 3A Pulse: 24Vdc 20mA
Contact Life	No Load: 10,000,000 switching, 250V 3A Resistive Load: 100,000 switching	
Memory	100 years, 100,000 renewals	
Accuracy	+/- %0,2	
Sampling Time	100ms	
Ambient temperature	Operating: -10...+55C, Storage: -20...+65C	
Dimensions	Width: 96mm, Height: 96mm, Depth: 110mm	
Panel cut dimensions	45+/-0,5 mm x 45+/-0,5 mm	
Weight	430gr	



1	TEMPERATURE INDICATOR	Displays oven temperature and error messages.
2	TIME INDICATOR	While timing is in progress, it shows the remaining time and becomes "0" when the time is over.
3	 1	It shows the status of the heater (R1) connected to the first sensor.
4	 2	It shows the status of the heater (R2) connected to the second sensor.
5	 3	Indicates the status of the heater (R3) connected to the third sensor.
6	 4	Indicates the status of the heater (R4) connected to the fourth sensor.
7		It lights up while steaming.
8		Flashes at 1s intervals while timing is in progress.
9	TEMPERATURE SETTING KEY	It is used to enter the temperature set values.
10	UP ARROW KEY	It is used to change the parameter value currently on the screen.
11	DOWN ARROW KEY	It is used to change the parameter value currently on the screen.
12	TIME SETTING KEY	It is used to set the runtime and steam time.


Setting the Temperature Value:

The key is pressed. When "----" appears on the display, the common set to the temperature display


value is adjusted to the desired temperature value with the  and  keys.


If the key is pressed one after the other, parameters for separate set values (5E.E.1, 5E.E.2, 5E.E.3, 5E.E.4) are displayed.

Setting the Time Value:

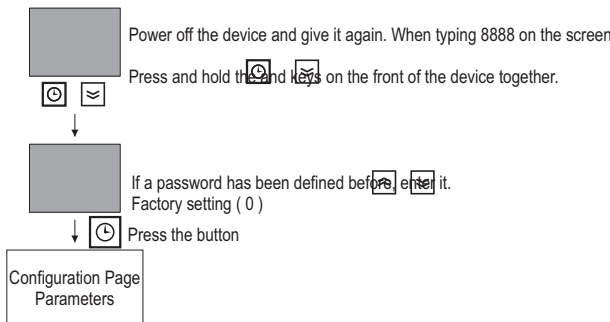
 The key is pressed. When "----" appears on the temperature display, the value in the time display

is set to the desired time value with the  and  keys.

 When the button is pressed a second time, the steam time set value comes. If steaming is automatic


steam release time is entered and waited. If steaming is automatic, steam is given by pressing the  button.



To Switch to the Configuration Page




Screen

Explanation

Par.01---  Security password to login to the configuration page. If a password is defined, the menu cannot be accessed without entering the password. The password is defined as (0) in the factory setting. In case of forgetting, the menu can be accessed by entering 5647.
Setting Options : 1999 - 9999

Par.02---  Used to restore factory settings. To do this, take this parameter to **on** position and press  keys together before and after this parameter is on the screen. When this process is done correctly, the device is reset and turned off and on again. Factory settings will be restored.

Par.03---  The decimal degree of measurement. When this parameter is changed, the set and hysteresis values should be checked.
Setting Options : 0 - 1





Par.04---  Determines the type of first sensor input.
Setting Options: Table 1

Table-1

AI1.T	Sensor Type	Standard	Temperature Range	
			(°C)	(°F)
TC-B	Type B Thermocouple	IEC584-1	60, 1820	140, 3308
TC-E	Type E Thermocouple	IEC584-1	-200, 840	-328, 1544
TC-J	Type J Thermocouple	IEC584-1	-200, 1120	-328, 1562
TC-K	Type K Thermocouple	IEC584-1	-200, 1360	-328, 2480
TC-L	Type L Thermocouple	DIN43710	-200, 900	-328, 1652
TC-N	Type N Thermocouple	IEC584-1	-200, 1300	-328, 2372
TC-R	Type R Thermocouple	IEC584-1	-40, 1760	104, 3200
TC-S	Type S Thermocouple	IEC584-1	-40, 1760	104, 3200
TC-T	Type T Thermocouple	IEC584-1	-200, 400	-328, 752
TC-U	Type U Thermocouple	DIN43710	-200, 600	-328, 1112

Par.05---  Determines the type of second sensor input.
Setting Options: Table 1

Par.06---  Determines the type of third sensor input.
Setting Options: Table 1

Par.07---  Specifies the type of the fourth sensor input.
Setting Options Table 1


Par.08---  It determines the function of "O1" analog output module.
Setting Options : Table 4

Table-4

0	off	Not Used
1	cou.1	1. transmit sensor output.
2	cou.2	2. transmit sensor output.
3	cou.3	3. transmit sensor output.
4	cou.4	4. transmit sensor output.
5	cou.5	5. transmit sensor output.



Par.09---  "O1" It determines the type of analog output module.
Setting Options : Table 5

Table-5

0	0-20	0-20mA
1	20-0	20-0mA
2	4-20	4-20mA
3	20-4	20-4mA
4	0-10	0-10V
5	10-0	10-0V
6	2-10	2-10V
7	10-2	10-2V

Par.10---  "O1"
 It determines the type of analog output module.
Setting Options : 1999 - 9999 *Unit* °C

Par.11--- It determines the upper scale of the "O1" analog output module.

Setting Options : 4999 - 9999 *Unit °C*

Par.12--- It determines the upper scale of the "O1" analog output module.

Setting Options : Table 2

Table-2

0	OFF	Not used
1	in 1	Work according to the first sensor.
2	in 2	Work according to the second sensor.
3	in 3	Work according to the third sensor.
4	in 4	Work on the fourth sensor.
5	in 1.2	Work on the average of the first and second sensors.
6	in 1.3	Work on the average of the first and third sensors.
7	in 1.4	Work on the average of the first and fourth sensors.
8	in 2.3	Work on the average of the second and third sensors.
9	in 2.4	Work on the average of the second and fourth sensors.
10	in 3.4	Work on the average of the third and fourth sensors.
11	4inp	Work on the average of the four sensors.

Par.13--- It determines which sensor of the second heating output "R2" relay output module will operate.

Setting Options : Table 2

Par.14--- It determines according to which sensor the "R3" relay output module of the third heating output will work.

Setting Options : Table 2

Par.15--- It determines according to which sensor the "R4" relay output module of the fourth heating output will work.

Setting Options : Table 2





Par.16		It determines which set value the "R1" relay will operate.
		Setting Options : Table 3


Table-3


0	set	Work according to the Common Setpoint.
1	set1	Work according to Set.1 value.
2	set2	Work according to Set.2 value.
3	set3	Work according to Set.3 value.
4	set4	Work according to Set.4 value.


Par.17		It determines which set value the "R2" relay will operate.
		Setting Options : Table 3


Par.18		It determines which set value the "R3" relay will operate.
		Setting Options: Table 3











Par.19		It determines which set value the "R4" relay will operate.
		Setting Options: Table 3

Par.20		It is the valid hysteresis value for heating outputs using common setpoint.
		Setting Options : 1 - 1000

Par.21		Hysteresis value based on SEt. 1 value.
		Setting Options : 1 - 1000

Par.22		Hysteresis value based on SEt.2 value.
		Setting Options : 1 - 1000

Par.23		Hysteresis value based on SEt.3 value.
		Setting Options: 1 - 1000

Par.24		Hysteresis value based on 5E.4 value. Setting Options : 1 - 1000
Par.25		Temperature debugging value connected to the first sensor. It adds or subtracts the value read from the sensor according to the (+) or (-) value entered in this parameter. Setting Options : - 1000 - 1000 Unit °C
Par.26		Temperature debugging value connected to the second sensor. It adds or subtracts the value read from the sensor according to the (+) or (-) value entered in this parameter. Setting Options : - 1000 - 1000 Unit °C
Par.27		Temperature debugging value connected to the third sensor. It adds or subtracts the value read from the sensor according to the (+) or (-) value entered in this parameter. Setting Options : - 1000 - 1000 Unit °C
Par.28		Temperature error removal value connected to the fourth sensor. It adds or subtracts the value read from the sensor according to the (+) or (-) value entered in this parameter. Setting Options : - 1000 - 1000 Unit °C
Par.29		Specifies the contact address. Setting Options : OFF(Close) , 1 - 127
Par.30		It determines the communication speed. Setting Options : 4.8 - 9.6 - 19.2 - 38.4
Par.31		Communication parity type. Setting Options : nonE(No) - odd(Single) - EUn(Couple)
Par.32		It determines the lower limit of all set values. Setting Options : 1999 - 5PHL Unit °C
Par.33		It determines the upper limit of all set values. Setting Options : 5PLL - 9999 Unit °C

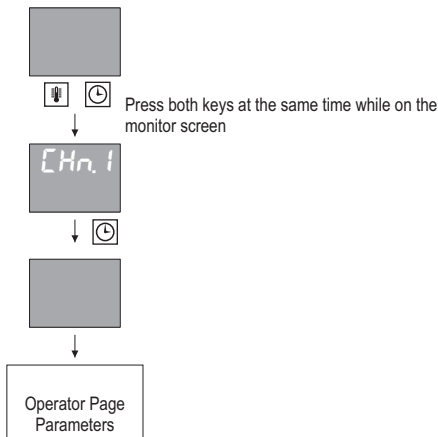
Par.38




A digital display with a grey background. The top line shows '5C.2' and the bottom line shows '0'.

Sets the password to enter the configuration page screen.

Setting Options : 1999 - 9999

To Switch to Operator Page



In order to access the operator page parameters, the  and  keys are pressed together while the device is energized, the  parameter appears on the screen. Password must be entered here, if any, otherwise the factory setting is defined as "0".

Screen

Explanation



Total operating hours of the device.



It determines which sensor information will appear on the main screen.

Setting Options: Table 4

Table-4

0	in 1	Shows the first sensor information.
1	in 2	Shows the second sensor information.
2	in 3	Displays the third sensor information.
3	in 4	The fourth shows the sensor information.
4	in 1.2	Shows the average of the first and second sensor information.
5	in 1.3	Shows the average of the first and third sensor information.
6	in 1.4	Shows the average of the first and fourth sensor information.
7	in 2.3	Shows the average of the second and third sensor information.
8	in 2.4	Shows the average of the second and fourth sensor information.
9	in 3.4	Shows the average of the third and fourth sensor
10	4inp	Shows the average of four sensor information.



It determines how the steaming process will be.

Setting options: nRn (Manual) - oLo (Auto)



It determines how the alarm will be given when the cooking time is over.

Setting options: LoN (Continuous) - tLn (Timed)



If the bUEr parameter is selected as tLn (time dependent), it determines how long the alarm will be given. It gives an alarm for the time entered here and stops the alarm at the end of the time.

Setting Options : 1 - 9999

CHn.1
0

Temperature information of the first channel.

CHn.2
0

Temperature information of the second channel.

CHn.3
0

Temperature information of the second channel.

CHn.4
0

Temperature information of the second channel.

Error message	Meaning
-SB-	Sensor connections are broken.
-Uf-	Process value is below sensor scale.
-Of-	The process value is above the sensor scale.
nn	The process value is too high to be displayed on the screen.
-vv-	The process value is too low to be displayed on the screen.

These devices are designed in such a way that serial communication can be established in slave mode with the standard MODBUS RTU protocol. With this communication, all parameters and variables in the device can be accessed. These parameters can be read and set.

Serial communication is done via RS485 line. 32 devices can be connected on a line.

The cable used in the communication line must be a shielded data cable suitable for Half-Duplex RS485 communication and this cable is connected to all devices in parallel as a single line. There must be a suitable terminating resistor at the beginning and end of the line. The length of a line that is prepared properly and has sufficient 9600 bps communication can be extended up to 1000 meters.

Each of the devices on the serial communication line must be given a separate communication address between 1 and 255, but the communication speed and parity type of all devices on a line must be the same. The communication address, communication speed and parity type of these devices are determined by the "Addr, baud ve Parity" parameters in the configuration page.

Supported functions, parameter addresses and other information required for communication in the standard MODBUS RTU protocol are given in the tables below.

Supported Standard MODBUS RTU Functions:

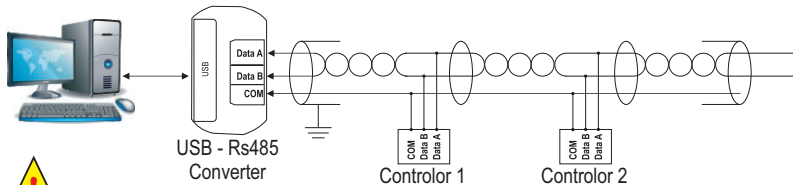
Function 01 = Read Coils

Function 03 = Read Holding Registers

Function 05 = Write Single Coil

Function 06 = Write Single Register

Function 16 = Write Multiple Registers



WARNINGS:

- Incorrectly connected sockets can cause data errors. In order to prevent this, a distinctive visuality can be provided with different colored cables. It makes identification easier by preventing cable connection errors.

Inter-Device Connection:

- The RS485 system used in MODBUS communication should be connected with as short branches as possible. The cable line should not be too long. Longer wiring may result in data reception disturbances and consequent errors.

Cable Selection:

- The cable used is shielded and twisted pair. The protective sheath may be covered with a fine wire mesh or foil. These two coatings are equivalent to each other.
- These features provide significant protection against electromagnetic disturbances. It is necessary to reduce the magnetic field effect that will occur in the environment, as the cables will show the coil feature working in opposite directions.

Ground Connection:

- The cable shield must be grounded at a single point. This grounding is done from the end of the cable.

Connecting Terminals:

- The cables are connected to screw terminals. According to the width of the sockets, the cables are connected by combining them. If the socket inputs are small, cable connection is made with suitable equipment.

Repeater Usage:

- A repeater can be used to increase the coverage of the MODBUS line. These repeaters strengthen and renew the data they receive from the devices and transfer them to other devices. A repeater is used every 1200 m and after every 32 devices connected to the line. The maximum number of repeaters to be connected in series is 3. A larger number of connected repeaters will cause delays on the line.

Termination Resistance:

- A 120Ω resistor is connected to both ends of the main cable to avoid signal errors and deviations. These resistors should be used at the cable ends. If the total cable length is less than 50 m, there is no need to use a resistor.

REGISTER Type Parameters(REGISTERS)

Address	Explanation	Setting Range		Write Perm.
10	1. sensor value read	0	0	No
11	2. sensor value read	0	0	No
12	3. sensor value read	0	0	No
13	4. sensor value read	0	0	No
60	(5E0) common setpoint	-1999	9999	Yes
61	(5E1) 1. relay setpoint	-1999	9999	Yes
62	(5E2) 2. relay setpoint	-1999	9999	Yes
63	(5E3) 3. relay setpoint	-1999	9999	Yes
64	(5E4) 4. relay setpoint	-1999	9999	Yes

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