Timpex

USER MANUAL

Automatic Regulation of burning

for fireplace stoves

ECO 20

CONTENT

1 DEVICE DESCRIPTION

1.1 Basic Description

The **ECO 20** is an automatic burn control device for fireplace stoves. It is not suitable for burn control in fireplace inserts or accumulation stoves.
This product offers unique features representing the cutting edge in burn control technology for an enhanced user experience.

- Overheating indication
- App color indicates optimal fuel quantity
- Can control 2 external devices
- Can be equipped with a second thermal sensor
- Control through mobile app

The ECO 20 is a fully autonomous control system. It is not necessary to connect the control unit to the mobile app. Not connecting will, however, make it impossible to adjust settings and / or receive information about the combustion process and overheat warnings.

The ECO 20 Puts an End to Overheating

Overheating is possibly the most wasteful home heating practice. It is very common to introduce more fuel than necessary for your heating needs; this results in most of the “extra” energy from the fuel escaping uselessly through the chimney. Aside from wasting fuel, this also significantly increases wear on the heating system, including the chimney.
The **ECO 20** can detect overheating and inform the user to add less fuel in the next refueling.

The mobile app informs the user about the current status throughout the entire burn process. Based on the current firebox temperature, the app displays 3 color indicators (yellow, green, red).
The user should adjust the fuel amount so that when the firebox is at maximum temperature, the app shows the green indicator. Once the current burn has progressed sufficiently, the app evaluates the adequacy of the fuel load used by displaying a colored dot in the top left corner of the app screen:

- yellow: fuel load was less than optimal
- green: fuel load was optimal
- red: fuel load was more than optimal (overheating)

1.2 General Information

Most fireplace stove manufacturers recommend using the air intake shutter to control the amount of air in the firebox, using the 100% – 50% – 0% positions. Start the fire with the shutter fully open, close it to one half when the firebox reaches maximum burn, and close it completely when only coals are left. This improves both the environmental and economic performance of the heating system: A fuel load lasts longer, heating is more efficient, and the energy left in hot coals is not lost through the chimney.
This approach does have an obvious problem: The user would have to continually mind the stove to keep adjusting the shutter at the right times. Automatic regulation systems address this problem, as they monitor the exhaust temperature and automatically adjust the shutter position in response.

The automatic regulation system has its own shutter mounted on the external air intake (EAI) flange or inside the flexible air intake hose. All modern stoves have a compatible EAI flange, usually with diameter 100 mm or 120 mm.
The automatic regulation then serves as the “brains” of your heating system, managing airflow to the firebox to maximize burn efficiency and extract as much useful thermal energy from your fuel as possible.

The Timpex system for automatic regulation of burning has a microprocessor-based control unit, which compares the current situation in the firebox with a “Combustion Optimization” program; depending on the results, the system adjusts the airflow to the firebox using an electronically-controlled motorized shutter in the external air intake.

1.3 Advantages of Automatic regulation of burning

- Increases burn time and refueling interval
- Improves fuel economy by up to 30%
- Prevents overheating
- Improves burning and heating efficiency
- Increases thermal comfort
- Enhances safety of heating
- Improves heating system longevity
- Can control additional external components (depending on device type)
- Signals when refueling is needed
- Provides information on heating system performance

3 MOBILE APP REQUIREMENTS

3.1 Android Devices

- Android 5 “Lollipop“ or newer Android OS
- Bluetooth LE
- GPS module

The app is available on Google Play under the name **Timpex ECO**.

QR Code for download:

3.2 Apple iOS Devices

- Apple iOS 11 or newer
- Bluetooth LE
- GPS module

The app is available on the App Store under the name **Timpex ECO**.

QR Code for download:

The app communicates with the control unit using your phone’s Bluetooth connection.
The app syncs data with the control unit every 10 seconds.

4 INSTALLING THE MOBILE APP

4.1 Downloading the Mobile App

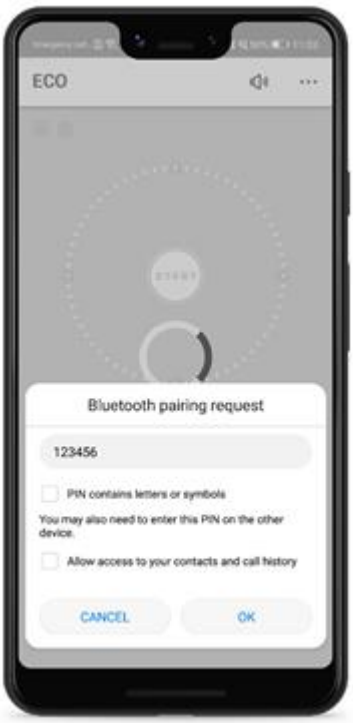
The mobile app is available on the Google Play Store and the Apple App Store; the app name is *Timpex ECO*. Open the app details in the store and tap “Install”; the app will then be automatically installed on your phone.

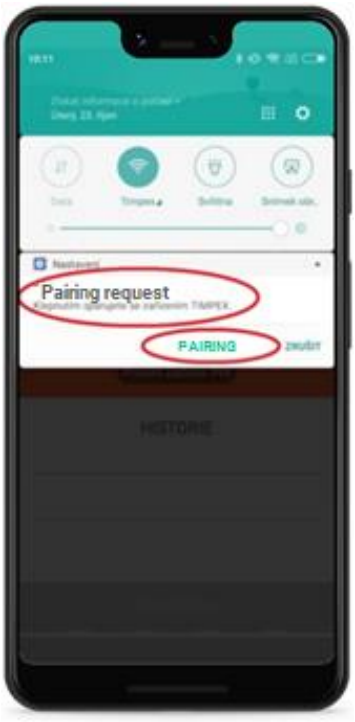
4.2 Pairing the App with the ECO 20 Control Unit

1. Turn on **Bluetooth** and **GPS positioning** on your device.
2. Launch the mobile app.
3. The app will need **permission** to access your device’s location. This is necessary because the app searches for your specific ECO 20 control unit only near your position.
4. Once launched, the app starts an automatic search for nearby ECO 20 devices. Once the search completes, the app will show a list of units found. Select the one called **Timpex_ECO**.
5. The app will then request a pairing password. Enter the default password **123456** and press OK to confirm.

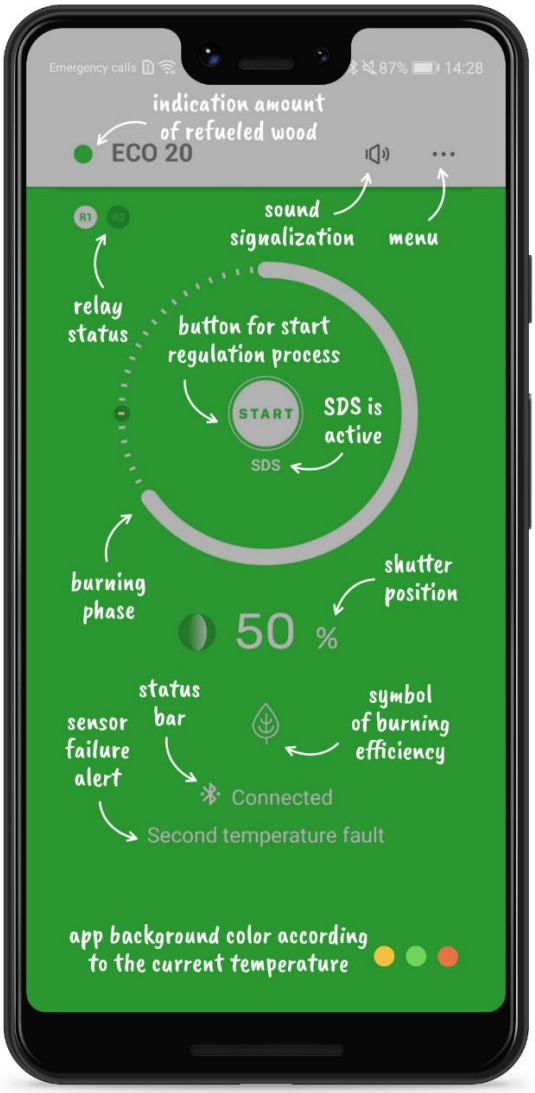
   Note: If the app failed to request a pairing password, check your phone’s notification bar. Some Android devices move the password request and entry to a notification item.
6. The mobile app is now paired with the ECO 20 device.

Note: The ECO 20 can only be paired with a single mobile device at a time. If you wish to connect another mobile device, you will need to disconnect the current one first.





5 MOBILE APP DOCUMENTATION



5.1 Main Screen

Background color

The app background alternates between four colors based on current firebox temperature:

- yellow - firebox temperature below optimum
  - should only show when starting a fire or when down to hot coals
- green - firebox at optimum temperature
  - best fuel efficiency – shows a green leaf icon
- red - firebox overheated
  - excess energy lost via chimney – shows a chimney icon

Grey colour means cold firebox (firebox at room temperature, no fire).

Indication amount of refueled wood

Shows the adequacy of the current fuel load.
Only shows once the “Burning phase” circle reaches position A.

Sound signalization

Turns the control unit’s sound alerts on or off – see “Control Unit Sound Alerts” below.
If you turn the alerts off, the unit will no longer use sounds to notify you of important situations.

Relay status

Shows the status of devices controlled by Relay 1 (R1) and Relay 2 (R2).

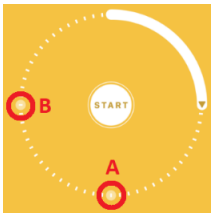
- White symbol – connected device is active
- Grey symbol – connected device is inactive
- R1 or R2 symbol not shown – no function was assigned to the relay in question

Menu

Open burn regulation settings, see “Menu” below.

“Burning phase“ circle

- Maximum burn point – A.
- Refueling point (with sound alert) – B



START button

Press to start a new automatic burn control cycle. Details see “Start Burn Control” below.

SDS activity

The SDS label indicates activity of the Software Door Sensor. When the SDS label shows, the unit is checking exhaust temperature for changes. When an exhaust temperature change occurs (indicating open door / refueling), the SDS starts a new burn cycle.
If the SDS isn’t performing properly (a new burn cycle does not start when refueling, or new burn cycles spontaneously start even though you haven’t refueled), try adjusting SDS sensitivity in Settings.

Shutter position

The current position of the external air intake (EAI) shutter

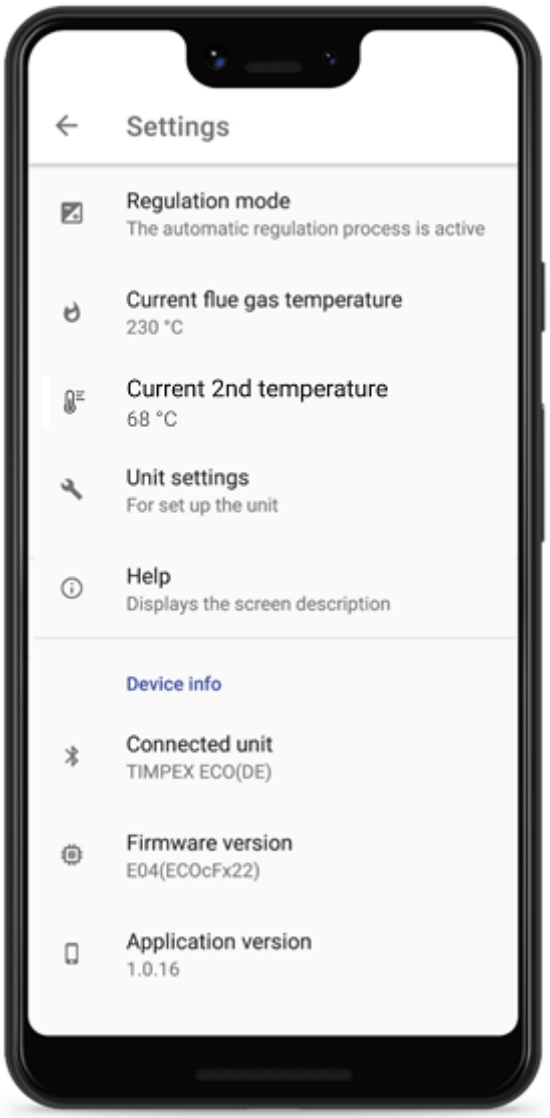
- 100% = EAI shutter fully open
- 0% = EAI shutter fully closed

Status bar

Shows whether the app is connected to a control unit.

5.2 Menu

Open the menu by tapping ••• at top right of the screen.



Regulation mode

Turn the automatic burn control process on or off.
When set to **off**, automatic burning regulation is inactive. The EAI shutter can then be moved manually using its attached handle, or the stove's own shutter handle can be used.
When automatic control is off, the Main Screen shows **MAN**, for "manual mode".

Current flue gas temperature

Current temperature of flue gas exiting the firebox, as read by the exhaust temperature sensor. The temperature readout stops showing when exhaust temperature drops to room temperature.

2nd temperature readout

Shows the current temperature readout from the second thermal sensor, if installed.

Connected unit

Shows the type of control unit the app is currently connected to.
Tap this item to disconnect the app from the current control unit.
This is useful when you want to connect your mobile device to a different Timpex control unit.

Firmware version

Shows the firmware version of the control unit connected to the app.
A text notification is shown by this item when a new firmware version is available for your control unit. We recommend updating the firmware whenever available to ensure your control unit remains up to date.

Application version

Displays the software version number of the mobile app.
We recommend checking for app updates regularly through Google Play (Android) or the App Store (Apple), or setting the app to auto-update.

Unit Settings

Here you can configure the control unit for your firebox and perform some maintenance tasks.
The Settings menu is password-protected; the default password is **1234**.

Contents

- **Program setting**
  - Allows you to select one of a number of pre-set control curves, each of which maps exhaust temperature to shutter position in a different way. The factory setting is no. 3, which should work well with most fireboxes.
  - If your firebox generally burns too hot using program 3, step down to program 2 or further down to 1.
  - If the firebox generally burns too cool, raise the setting to program 4 or 5.
- **Software door sensor /SDS/**
  - The SDS bypasses the need to push START in the app when beginning a new burn cycle.
  - The SDS is a software algorithm that monitors the changes of current exhaust temperature, from which it can infer that fuel was added and / or the firebox door was opened, and start a new burn control cycle accordingly.
  - When using the SDS feature to auto-start the burn cycle, **keep the firebox door slightly open after refueling until the control unit sounds an alert** (3 short beeps).
  - The sensitivity of the SDS algorithm to temperature changes can be calibrated in steps from 1 to 5.
    - The factory default setting is 3.
    - If you would like the SDS to be more sensitive to temperature changes, increase the value to 2 or further up to 1.
    - If you want the SDS to be less sensitive, lower the value to 4 or 5.
- **Test**
  - Test the functionality of the automatic regulation system. Click an item to test EAI shutter open / close, sound alerts, relay contacts on / off, and (when installed) color LED function.

- **Factory reset**
  - Resets the control unit to factory default settings.
- **Relay 1 settings / Relay 2 settings**
  - Select the function to use when controlling external devices by relay
  - The relay contacts are voltage-free. To control a 230 V device you will need an External 230 V Control Unit. For recommendations for the electric wiring of external 230 V devices to the control unit, see “ECO – Wiring 230 V Devices”.
  - **Never connect 230 V power directly to the relay!**
  - Relays can be assigned the following functions:
    - **Off**
      - relay is inactive, does not show up on Main Screen
    - **Hood**
      - relay contacts open for 5 minutes after START command is received
    - **Energy recovery ventilator**
      - relay contacts closed for 5 minutes after START command is received
    - **Burning time**
      - relay contacts are closed for entire duration of active burn control, incl. hot coals phase
    - **Pump**
      - relay contacts close when thermal sensor 2 (T2) reaches preset temperature (default is 58 Celsius); contacts open when T2 temperature readout drops 3 Celsius below the preset value
      - integrated overheating protection: if water temperature in heat exchanger reaches 90 Celsius, the control unit closes shutter to 25% open to reduce exhaust temperature; overheat protection disengages (shutter returns to normal control) when temperature drops to 85 Celsius
    - **Refuel signal**
      - relay contacts close for 1 minute when a refueling request is fired
    - **Exhaust fan**
      - relay contacts close upon receipt of START command and open once thermal sensor 1 (T1, monitoring exhaust temperature) reaches 180 Celsius
    - **Heating by T1**
      - universal function: relay contacts close when temperature preset on T1 (exhaust temperature) is reached; relay contacts open when T1 temperature exceeds preset value by 10 Celsius
    - **Heating by T2**
      - universal function: relay contacts close when temperature preset on T2 is reached; relay contacts open when T2 temperature exceeds preset value by 5 Celsius
    - **Cooling by T1**
      - universal function: relay contacts close when temperature preset on T1 (exhaust temperature) is reached; relay contacts open when T1 temperature drops 10 Celsius below preset value

- **Cooling by T2**
  - universal function: relay contacts close when temperature preset on T2 is reached; relay contacts open when T2 temperature drops 5 Celsius below preset value

When using functions triggered by burn cycle start, the SDS (Software Door Sensor) reacts with a delay. If you need the relay contacts to react immediately, you will need to either manually start the burn cycle by pressing START in the mobile app, or install the optional Magnetic Door Sensor.

6 CONTROL UNIT SOUND ALERTS

The control unit can signal certain states and requests using an internal beeper module mounted on the unit's circuit board.

Beeper signals:

- Unit power-on
  - 3 short beeps
- New burn start (firebox refueled, EAI shutter open to 100%)
  - 3 short beeps
- Firebox door open too long (left open or partly open)
  - 3 long beeps every 3 minutes
- Request to refuel
  - 1 long beep + 4 medium-length beeps
- Going to standby (firebox was not refueled, EAI shutter closed to 0%)
  - 1 long beep + 4 medium-length beeps
- Thermal sensor malfunction
  - 1 short beep every minute

Audio signals can be turned on / off by tapping the speaker icon in the mobile app main screen.

7 USING AUTOMATIC REGULATION OF BURNING

7.1 Start

Starting burn control launches a new controlled-burn process. At start, the EAI shutter opens fully to provide maximum airflow into the firebox. An audio signal of 3 short beeps is played to confirm successful launch.

Burn control can be started automatically or manually:

- Automatic
  - When SDS is activated
  - Using the Magnetic Door Sensor, when installed
- Manual
  - Pressing the START button in the mobile app
  - Pressing a mechanical button, when installed

Burn control must be restarted whenever refueling!

When using the Magnetic Door Sensor, turn SDS off.

7.2 Refueling

When refueling is needed, the control unit emits a beep signal (1 long beep + 4 medium-length beeps). The mobile app displays refueling requests by moving the “Burning phase” indicator to position B.

Always adhere to fuel quantity and type recommendations provided by the heating system manufacturer!

8 SAFETY INSTRUCTIONS

All persons handling 230 V power systems must be qualified in accordance with government regulations applicable in your country.

8.1 What to Do in Case of Power Outage

In the event of mains power failure to the automatic regulation process, there is no need to reduce or stop heating, regardless of which phase the burning control program was in at the time of the outage. However, unless you have purchased the return spring shutter option, keep in mind that the air intake shutter will have remained in whatever position it was in before power failed.
If you subsequently need to refuel, it is **essential** to manually open the air intake shutter to the 100% position.

If your heating system includes a water heat exchanger, you cannot continue heating during a power outage. Potentially dangerous unmonitored increases in exchanger water temperature and pressure could occur, as the water pump cannot circulate and cool the water.

Once electric power has been restored, no further manual changes to the combustion control system are required.

If your installation includes a water heat exchanger, we recommend you purchase our backup power supply.

8.1.1 Manually opening the EAI shutter

The EAI shutter can be manually opened using the plastic handle attached to its shaft. Turn the handle clockwise as far as it will go. (Avoid using excessive force to prevent damage to the silicon seal of the shutter.)

9 HEATING WITH AUTOMATIC REGULATION

9.1 Starting Fire and Refueling

Whenever refueling, a new automatic burn control cycle must be started. This may be done automatically or manually (see “Start” section above).
Once the burn control system is started, the mobile app background turns yellow (firebox warming up).

Note: When using the SDS to start a burn cycle, **leave the firebox door slightly open after refueling** until the control unit receives the SDS signal, which it will indicate by 3 short beeps.

Once a burn control cycle has started, the system opens the EAI shutter to 100% and subsequently gradually closes it in accordance with the selected control curve (program).

9.2 Automatic Regulation Mode

Once the starting temperature has been reached, automatic regulation of burning starts. The program ensures optimal combustion and maximizes heating efficiency.

Once the firebox reaches **maximum** temperature, the app background should ideally turn **green**. If it does not, there is too little (yellow) or too much (red) fuel.

As firebox temperature decreases, the app background will return to **yellow**.

The app displays an **indicator dot** at the top of the Main Screen showing the amount of refueled wood in last burning cycle.

9.3 Residual Heat

Once the conditions for residual heat mode (i.e., hot coals) have been reached, an audio signal is played to indicate that you might wish to add fuel. It is not necessary to refuel immediately; the signals are notifications only. If you do add fuel, you will need to re-start the burn control process.

9.4 Program End

If no fuel is added, the program continues closing the intake shutter, until it eventually closes completely (0%) and the app background turns grey.

10 COMMON ERRORS AND SOLUTIONS

App background is red during whole burn cycle

- Most likely bad wiring on the thermal sensor. Make sure that wires to the sensor are correctly and tightly plugged in, and check that the sensing tip and the wiring of the sensor itself are undamaged.

App background remains only yellow or grey throughout the burn cycle

- Your firebox may not be capable of reaching the temperature preset as optimal for the selected program. Go to the mobile app and switch to a cooler (lower-numbered) program.

The EAI shutter keeps opening to 100% (full open)

Caused by the SDS or physical door sensor, if present.

- If using SDS, go to the mobile app's Settings and lower SDS sensitivity.
- If using the Magnetic Door Sensor (with SDS turned off), check that the gap between the main body of the sensor and the magnet is not greater than the recommended maximum of 10 mm.

The app rejects the PIN

- The correct PIN is always **123456**. Some mobile phone manufacturers choose to display "helpful" suggestions of other "commonly used" default PINs. These are, in this case, incorrect and should be ignored.

The app fails to connect to the control unit

- First, make sure that your device meets the app's software requirements.
- Second, verify that no other mobile device is currently paired to the control unit. The control unit is only capable of being paired with one device at a time.

The app displays "MAN" on the main screen and automatic regulation is not working

- Automatic regulation is turned off in the app Settings. Turn it on in menu.

Current exhaust temperature readout shows "- - -"

- The exhaust temperature readout only shows when flue gas is warmer than the environment. Temperatures below 25 Celsius are not shown; the "- - -" symbol displays instead.
- If "- - -" continues to show even when the firebox is hot, check the thermal sensor for bad wiring and / or damage.

I have assigned a function to a relay, but the connected device does nothing

- The relay contacts are voltage-free. Some external devices may require 230 V control circuits. For these, you will need the optional External 230 V Control Unit.

The app background is grey (cold firebox), but the EAI shutter is 100% open

- There may have been a malfunction on the thermal sensor during the last burn cycle. In this case, the control unit reacts by opening the shutter to 100%, for safety reasons.

- Try press START button. If the sensor problem has resolved itself, a new burn cycle should continue normally without the need for you to do anything. If it does not, check the thermal sensor for bad wiring and / or damage.

11 GENERAL NOTICES

- This Manual is an integral part of your purchase; we recommend storing it near the device so as to have it available for reference when needed.
- The device is not designed for any use other than those described in the User and Service Manuals.
- The operator should regularly visually check the condition of the device and provide basic care and maintenance.
- Do not expose the control unit to temperatures over 50 Celsius, contact with water or excessive humidity. Only use the unit within its operating parameters. Do not expose the unit to a combination of high humidity and large temperature swings, which may cause water vapor to condense inside and damage the unit.
- Disconnect all electrical connections before performing any maintenance on the device!
- In the event of malfunction, please return the device to the distributor, along with a detailed description of the problem.

12 TECHNICAL DATA

Control unit input power	5V/DC, 50Hz 0,3A
Control unit heat resistance	max 50°C
Temperature sensor heat resistance	iron part max 700 °C
Type of temperature sensor T1	thermocouple – type K
Typ teplotního čidla T2	resistance sensor – type PTC
Disposal method	dispose of as separate waste
Cable attachment method	konektorové zapojení
Control unit IP	IP 40
Software class	A (control functions do not affect device safety)

13 RECOMMENDED ACCESSORIES

13.1 External LED Indicator

A color LED showing the current firebox temperature on the same three-color scheme as the Main Screen of the app. The LED remains on throughout the burn cycle.
Installing the LED saves you the need to check the mobile app to see current firebox temperature.

13.2 START Button

A button to manually start automatic regulation.
Pressing the button immediately starts a new burn cycle and opens the EAI shutter to 100%.

13.3 Magnetic Door Sensor

An optional sensor for a more reliable auto-start function.
Unlike with the SDS, which has a time delay, the Magnetic Door Sensor automatically starts a new burn control cycle immediately when the firebox door is opened.
The Magnetic Door Sensor must be mounted on the firebox frame.

THANK YOU FOR USING OUR PRODUCT

Thank you for purchasing our product, the **ECO 20** Automatic Regulation of Burning for fireplace stoves. This product is the result of our many years of experience with burn control systems.
We trust the product will fulfill your expectations.

TIMPEX spol. s.r.o.	
Automatic regulation of burning	
Model:	ECO20
INPUT POWER:	5V DC
RATED FREQUENCY:	50Hz
RATED INPUT:	0,3 A
OUTPUT	
SERVO:	5V DC
INGRESS PROTECTION:	IP40

Made in Czech Republic