ECO 21
Mini controller



Signaller or two-point controller

Large display for process value or setpoint

Simple operation

Output sense selectable direct/inverse

Accurate control behaviour with 250 ms scanning cycle

Fully automatic self-tuning function

High-precision universal input

Setpoint & limit value adjustment can be disabled

Two switching outputs (control output & alarms)

Front panel protection mode IP 66

economy line

GENERAL

Due to its extremely compact dimensions, the ECO 21 can be installed even in the smallest machines. Its universal input and up to three switching outputs enable the controller to be adapted perfectly to the most varied automation tasks.

The unit is configurable as a signaller or PID two-point controller with inverse (heating) or direct (cooling) characteristic. Moreover, the fully automatic self-tuning function eliminates the need for manual control parameter adjustment.

SAFE OPERATION

The unit is operated by means of just 3 front-panel keys that provide access to the following levels:

– Operation (standard)
– Parameter adjustment
– Configuration

The adjustment of setpoint and alarms from the front can be disabled.

DISPLAYS

During normal operation, the large 3-digit LED display ensures easy reading of the process value.

In the Parameter Level, the display alternates between the parameter name and its value, whereby the scroll key is used to call the different parameters sequentially for adjustment

In addition, 4 indicator LEDs show the following operating conditions by means of On, Off, or Blinking:

Green LED (control deviation)
Process value < setpoint : Off
Process value = setpoint : On
Process value > setpoint : Blinking

Yellow LED (operating mode)
Normal operation : Off
Parameter Level selected : On
Configuration Level selected : Blinking

Red LED (alarm)
Blinks with an active alarm.

Fault display
Exceeded measuring range and sensor fault are indicated.

Options
Optionally, an additional relay (Alarm 1) can be fitted.

UNIVERSAL INPUT

The input is configurable for all conventional signal and sensor types. With thermocouple or Pt 100 input, the resolution can be selected with or without decimals.

Apart from °C, the display can be changed to °F.

In case of a sensor fault, the control outputs are switched off (0% output), and the alarm is triggered (if fitted).

Offset
For the purpose of measurement correction, a constant value can be added to the measurement signal.

CONTROLLER FUNCTIONS

The unit is configurable as a signaller or PID controller.

Self-tuning function
The fully automatic self-tuning function at power-up eliminates the need for manual adjustment of the PID parameters.

Setpoint
The setpoint is adjustable from the front; adjustment can be disabled.

Operating sense
The operating sense for heating can be switched from 'inverse' (Heating) to 'direct' (Cooling).

CONFIGURABLE ALARM OUTPUT

The alarm output works in the normally de-energized mode: the relay is energized in case of an alarm, and the corresponding LED blinks.
The alarm function is configurable as absolute or relative measurement value alarm (min. or max.) or bandwidth alarm (symmetrical to setpoint).

GALVANIC ISOLATION

The universal input is galvanically isolated from the power supply. The logic output is not isolated from the input.

TECHNICAL DATA

UNIVERSAL INPUT

Scanning cycle
250 ms

Input resolution
Approx. 14 bits

Input resistance
Thermocouples, mV: >10 MΩ

MEASURING RANGES

Engineering units
°C or °F are selectable. The °F values can be converted from the °C values specified below.

Thermocouples

Types
J + L (Fe-CuNi)
K (NiCr-Ni)
T (Cu-CuNi)
N (Nicrosil-Nisil)

Span start: 0 °C

End of span
In steps of 100, starting at 100 °C and up to 800 °C (< 400 °C for Type T).

Characteristic
Temperature-linear

Sensor monitoring
Response time: 2 s
Controller outputs are switched off (output value 0%), and alarm is triggered (if fitted).

Measurement error
0,25% of measuring range ± 1 digit (Types J and T: 0,25 %)

Cold-junction compensation
< ±0,7 °C at reference conditions.

Resistance thermometer
Sensor: Pt 100

Span start: -50 °C or 0 °C

End of span
99,9 °C or in steps of 100, starting at 100 °C and up to 800 °C.

Characteristic: temperature-linear

Connecting principle: three-wire

Sensor monitoring
Acts on sensor break and short circuit. Controller outputs are switched off (output value 0%), and Min alarm is triggered.
Response time: 2 s

Measurement error
< ±0,25% of measuring range ± 1 digit.

OUTPUTS

Types:
1 x relay or 1 x logic;
optionally 1 additional relay (Alarm 1)

Relays
Contact type:
potential-free, normally open

Contact rating:
Max. 2 A / 240 VAC, resistive load,
Min. 100 mA, 5 V AC/DC

Electrical service life: 500.000 switching cycles at max. contact rating.

- If the relays operate external contactors, these must be fitted with RC snubber circuits to prevent excessive switch-off voltage peaks.

Logic output
Load: >10 V with 20 mA into >500 Ω load

POWER SUPPLY

AC voltage
Voltage: 90...264 VAC
Frequency: 50/60 Hz
Power consumption: 7,5 VA

Universal supply
Voltage: 20...50 VAC, 50/60 Hz and 22...65 VDC
Power consumption: 7,5 VA or 4 W

CONTROL BEHAVIOUR

Control parameters
The control parameters are determined automatically after every power-up, and cannot be changed manually.

Factory settings
Proportional band: 10 %
Integral action time: 300 s
Derivative action time: 50 s

Switching duty cycle
0,5 s (only logic output); 1, 2, 4, up to 512 s

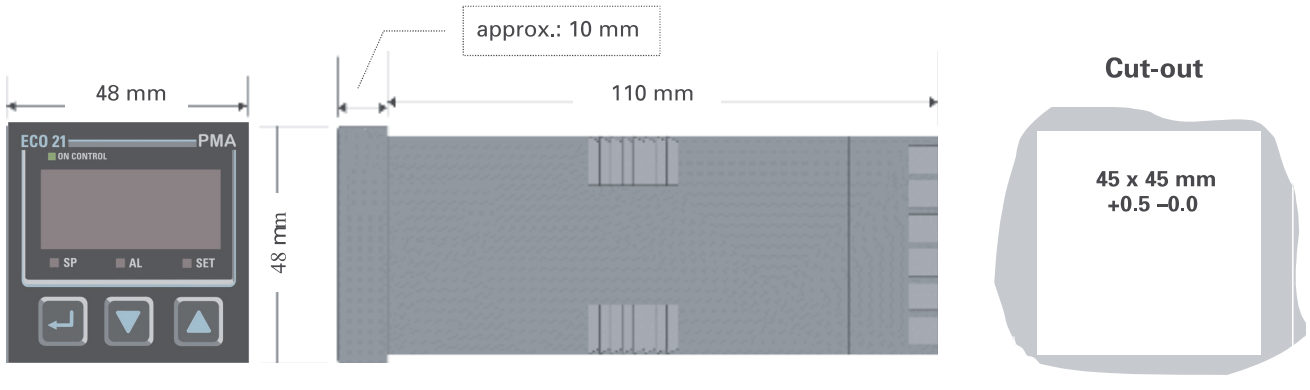
Hysteresis (only signaller)
0,75 % of measuring range

Operating sense
Inverse ('heating') or direct ('cooling')

Output response on sensor break
Controller outputs switched off.

Scanning cycle: 250 ms

Overall dimensions (in mm)



ALARM 1

See text for a description of the functions.
Quantity: 1 (min or max)

ENVIRONMENTAL CONDITIONS

Operating temperature: 0...55 °C
Relative humidity: 20...95 %, no condensation
Storage temperature: -20...+80 °C

Reference conditions

(for specified accuracy)
Ambient temperature: 20 °C ±2 °C
Humidity: 60...70 % rH
Supply voltage: 100...240 VAC, 50 Hz ± 1%
Source impedance (TC): < 10 Ω
Lead resistance (Pt 100): < 0,1 Ω per lead

TESTS

Electrical safety

According to DIN EN 61 010-1
Over-voltage category II
Contamination degree 2
Working voltage range 240 VAC

Electromagnetic compatibility

According to EN 61 326

GENERAL

Housing

Front dimensions: 48 x 48 mm (1/16 DIN)
Mounting depth: 110 mm
Front panel cutout: 45 x 45 mm

Protection mode

Front: IP 66

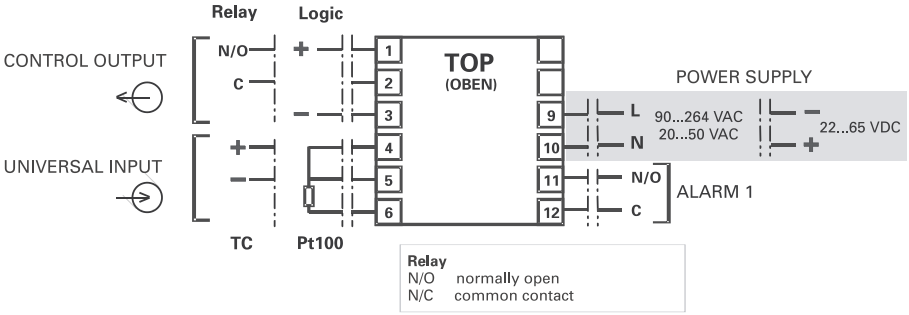
Electrical connections

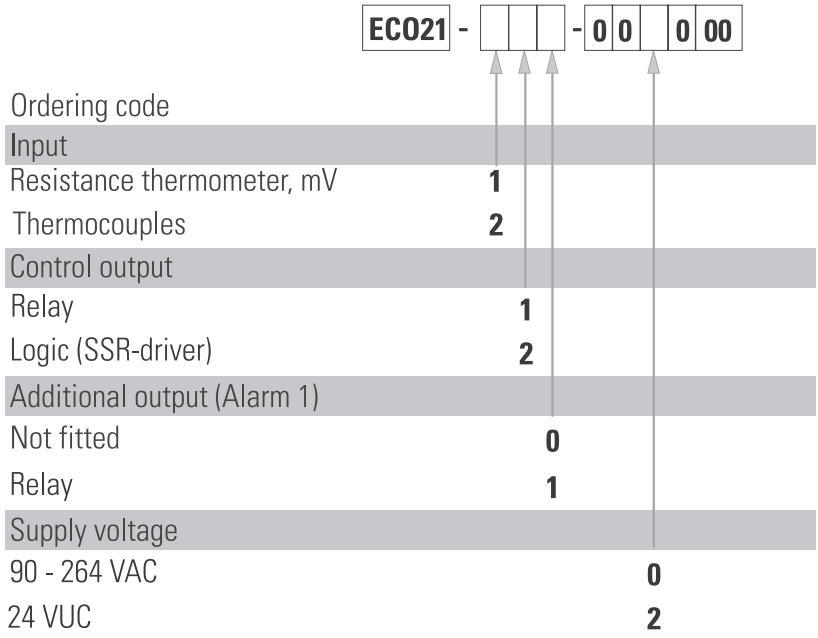
Screw terminals for max. 1,5 mm²

Weight: approx.:

190 g

Connecting diagram





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