# Platinum™
## SERIES
### athenacontrols.com

# Controller - Indicator - Transmitter
## 1/32 DIN - 48 x 24 mm
### Platinum™ Series C10 Line

## Small, easy to use, and versatile

The Athena Platinum™ C10 line offers the space-saving benefits of a 1/32-DIN size with many useful features typically found only in larger models. It provides not only the functionality of a controller, but can also serve as either a panel indicator or an indicating temperature transmitter.

Standard features include auto-tuning and IP65 front panel protection. Options include serial communications, analog retransmission output, and transmitter power supply.

## ATHENA
The Temperature Control Company

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# Platinum™
## S E R I E S
athenacontrols.com

## The right solution for your needs

| Your Need | Our Solution |
|---|---|
| Small panel cutout requirements and compact instrument size | 1/32 DIN - 48 x 24 mm size |
| Easy replacement and quick start-up | Configuration by simple to use codes |
| Correct tuning for any condition | Automatic selection between two different methods |
| Conversion and retransmission of low level signals | Transmitter with isolated and analog outputs |
| Alarm signaling | Absolute, band, and deviation alarms |
| Interfacing with other devices | Serial communications at 9600 baud Modbus/Jbus protocol, analog retransmission output |
| Short learning curve | All Platinum Series models share the same operating method |
| Ergonomic compatibility with other devices | Two colors: beige or dark gray front panels |
| Environmental protection | IP65 front-panel rating (indoor dust and water protection) |
| Easy to use | Ergonomic keypad, clear and easily understood displays |
| Noise immunity | Electromagnetic compatibility |
| Universal input signals, linear as well as non-linear | Configurable input (TC, RTD, mA, Volt and $\Delta$T, infrared sensor) |
| Reliability and safety | CE compatibility, cULus, 3 year warranty |
| Technical support | Technical applications assistance from ATHENA sales and after sales service |

## Resources

### Operating Mode
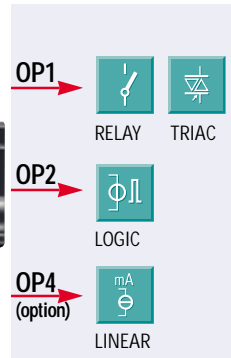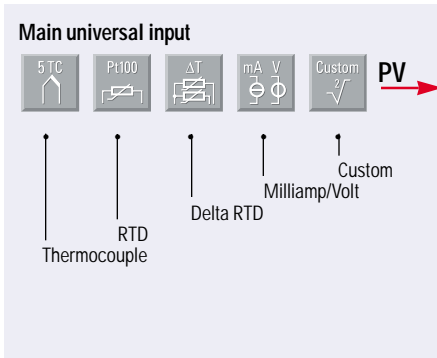
| | Control | Alarms | | Retransmission |
|---|---|---|---|---|
| | | | | PV |
| 0 | Indication only | OP1 | OP2 | OP4 |
| 1 | Single output | OP1 | OP2 | OP4 |
| 2 | Single output | OP2 OP1 | | OP4 |

**Main universal input**

5 TC — Thermocouple
Pt100 — RTD
$\Delta$T — Delta RTD
mA V — Milliamp/Volt
Custom $\sqrt[2]{}$ — Custom

PV

C10

OP1 → RELAY / TRIAC

OP2 → LOGIC

OP4 (option) → LINEAR

**Setpoint**

LOC

**Modbus RS485**
Parameter supervision (option)

**Fuzzy tuning** with automatic selection
One-shot auto-tuning
One-shot natural frequency

# Technical Data

| Features at Env. 25°C | Description | | | |
|---|---|---|---|---|
| Total configurability | From keypad or serial communications, the user selects:<br>- the type of input<br>- the associated functions and the corresponding outputs<br>- the type of control algorithm | | - the type of output and the safe conditions<br>- the type and functionality of the alarms<br>- the values of all the control parameters | |
| Process Variable (PV) input (for signal ranges see Table 1) | Common characteristics | A/D converter with 50,000 points<br>Update measurement time : 0.2 sec<br>Sampling time : 0.5 sec<br>Input shift : ± 60 digits<br>Input filter : 1...30 sec (OFF= 0) | | |
| | Accuracy | 0.25% ± 1 digit (T/C and RTD)<br>0.1% ± 1 digit (mA* and mV) | | Between 100 and 240V~ error is minimal |
| | Resistance thermometer (for ΔT: R1+R2 must be <320Ω) | Pt100Ω at 0°C (IEC 751)<br>°C /°F selectable | 2 or 3 wire connection | Line: 20Ω max (3 wire)<br>Thermal drift 0.35°C/10°C env. T.<br><0.35°C/10Ω line resist. |
| | Thermocouple | L,J,T,K,S (IEC 584)<br>°C /°F selectable | Internal cold junction compensation | Line: 150Ω max<br>Thermal drift <2µV/°C env. T.<br><5µV/Ω line resist. |
| | DC input (current) | 0/4...20mA with 2.5Ω ext. Shunt<br>Rj > 10MΩ | Engineering units, floating decimal point, Low Range -999...9999 | Input drift: < 0.1%/20°C env. T. |
| | DC input (voltage) | 0/10…50mV<br>Rj >10MΩ | High Range -999...9999<br>100 digits minimum | |
| Operating modes | Indicator with 2 alarms | | AL1 alarm | AL2 alarm |
| | | | OP1- relay or triac | OP2 - Logic |
| | | | OP2 - Logic | OP1 - relay or triac |
| | 1 PID loop or ON/OFF with 1 alarm | | Control output | AL2 alarm |
| | | | OP1 - relay or triac | OP2 - Logic |
| | | | OP2 - Logic | OP1 - relay or triac |
| Control mode | Algorithm | P.I.D. with overshoot control or ON/OFF | | |
| | Proport. band (P) | 0.5…999.9% | | |
| | Integral time (I) | 0.1…100.0 min. | OFF = 0 | P.I.D. algorithm |
| | Derivative time (D) | 0.01…10.00 min. | | |
| | Cycle time | 1…200 sec.s | | |
| | Overshoot control | 0.01…1.00 | | |
| | High limit | 100.0…10.0% | | |
| | Hysteresis | 0.1…10.0% | | ON/OFF algorithm |
| Output 1 (OP1) | SPST relay N.O., 2A/250V~ for resistive load | | | |
| | Triac, 1A/250V~ for resistive load | | | |
| Output 2 (OP2) | Logic (SSR drive) not isolated: 5V–, ± 10%, 30mA max | | | |
| Alarm 1 (AL1) (indicator with 2 alarms) | Hysteresis 0.1…10.0% range | | | |
| | Active high | Absolute threshold, whole range | | |
| | Active low | | | |
| Alarm 2 (AL2) | Hysteresis 0.1…10.0% range | | | |
| | Action | Active high | Action type | Deviation threshold ± range |
| | | | | Band threshold 0…range |
| | | Active low | | Absolute threshold, whole range |
| | | Special function | Sensor break | |
| Setpoint | Up and down ramps | | 0.1…999.9 digit/min (OFF = 0) | |
| | Low limit | | from low range to high limit | |
| | High limit | | from low limit to high range | |
| (Option) PV retransmission output | Galvanically isolated: 500V~/1min<br>Resolution: 12 bit (0.025%)<br>Accuracy: 0.1% | | Current output:<br>0/4...20mA 750Ω/15V max | |
| One-shot Fuzzy tuning | Depending on the process condition, the controller applies the best method | | Step response | |
| | | | Natural frequency | |
| Ser. comms. (opt.) | RS485 isolated, Modbus/Jbus protocol 1200, 2400, 4800, 9600 bit/sec, two wires | | | |
| Aux. p. supply | +18V– ±20%, 30mA max for external transmitter supply (Option) | | | |

*Requires field calibration for 0.1% accuracy

| Input Type | Scale Range | |
|---|---|---|
| RTD Pt100Ω at 0°C | -99.9…300.0<br>-99.9…572.0 | °C<br>°F |
| | -200…600<br>-328…1112 | °C<br>°F |
| T/C type L Fe-Const. | 0…600<br>32…1112 | °C<br>°F |
| T/C type J Fe-Cu 45% Ni | 0…600<br>32…1112 | °C<br>°F |
| T/C type T Cu - CuNi | -200…400<br>-328…752 | °C<br>°F |
| T/C type K Chromel- Alumel | 0…1200<br>32…2192 | °C<br>°F |
| T/C type S Pt10%Rh-Pt | 0…1600<br>32…2912 | °C<br>°F |
| 0/4…20 mA<br>0/10…50 mV | Configurable engineering units mA, mV, V, bar, psi, RH, pH | |

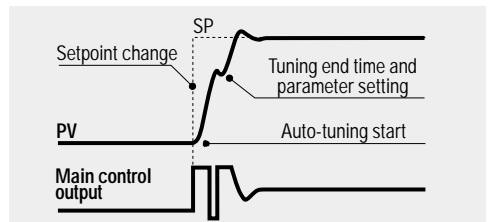**Table 1 : Process Variable (PV) Inputs/Signal Ranges**

## Fuzzy Tuning

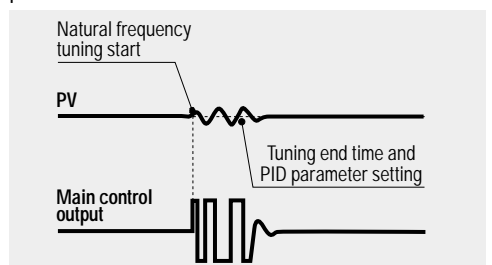Two methods of tuning are available:
- **Auto-Tuning (one-shot)**
- **Natural Frequency (one-shot)**

**Fuzzy Tuning** automatically selects one of the two methods which ensure the best result for each condition.

The **Auto-Tuning** method works best on the step response basis. When activated, if a deviation exists between the setpoint and process variable larger than 5% of scale range, the controller modifies the output value. Then, in a short time, it calculates the P.I.D. parameters and the new algorithm is operational immediately. The main advantages of this method are fast calculation and quick implementation.

The **Natural Frequency** method works best when the process variable is very near to the setpoint. When activated, it causes a process oscillation around the setpoint value. The main advantage of this method is a reduced disturbance to the process.
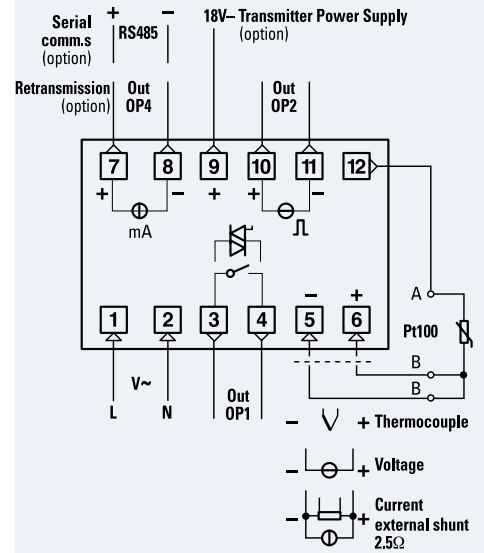
# Technical Data

| Features at env. 25°C | Description | |
|---|---|---|
| **Operational safety** | Measured input | Detection of out of range, short circuit, or sensor break with automatic activation of the safety strategies and alerts on display |
| | Control output | Safety value: 0…100%. (user enabled/disabled) |
| | Parameters | A permanent, non-volatile memory stores all parameter and configuration values |
| | Password | A password protects access to the instrument's configuration |
| **General characteristics** | Power supply | 100-240V~ (-15% +10%) 50/60Hz or 24V~(-25% +12%), 50/60Hz and 24V– (-15% +25%). Power consumption 1.6W max |
| | Safety | Compliance EN61010-1 (IEC 1010-1), installation class 2 (2500V), pollution class 2, class II instrument |
| | Electromagnetic compatibility | Compliance to CE standards for industrial system and equipment |
| | Protection EN60529 (IEC 529) | IP65 front panel |
| | Overall dimensions | $^1/_{32}$ DIN - 48 x 24mm, depth 120mm, weight 100g appr. |
| | | Panel cutout: 45$^{+0.6}$ x 22.2$^{+0.3}$ mm |
| | Approvals | cULus |

## Electrical Wiring



# Ordering Codes

Model:  **C10**  **A**  **B**  **C**  **D**  –  **E**  **F**  **G**  **H**

Line — C10
Basic Model — A B C D
Accessories — E F G H

Power supply — A
Outputs — B
Option 1 — C
Option 2 — D
Special functions — E
User manual — F
Color — G
Mounting — H

Model Example: C10-3356-0312
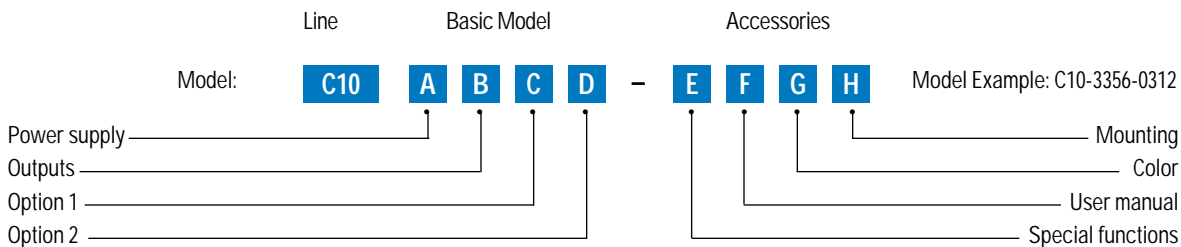
| Power Supply | A |
|---|---|
| 100-240V~ (-15% +10%) | 3 |
| 24V~ (-25% +12%) or 24V– (-15% +25%) | 5 |

| OP1 Output | OP2 Output | B |
|---|---|---|
| Relay | Logic | 0 |
| Triac | Logic | 3 |

| Option 1 | Option 2 | C | D |
|---|---|---|---|
| None | None | 0 | 0 |
| | Transmitter power supply | 0 | 6 |
| | Transmitter power supply + retransmission | 0 | 7 |
| RS485 Modbus/jbus protocol | None | 5 | 0 |
| | Transmitter power supply | 5 | 6 |

| Special Functions | E |
|---|---|
| None | 0 |

| User Manual | F |
|---|---|
| English-Spanish | 3 |

| Front Bezel Color | 0/4-20 mA input shunt resistor* | G |
|---|---|---|
| Dark gray (std) | Standard resistor | 0 |
| Beige | Standard resistor | 1 |
| Dark gray | High-accuracy resistor | 2 |
| Beige | High-accuracy resistor | 3 |

| Mounting (DIN rail excludes UL) | H |
|---|---|
| Panel (std) | 0 |
| DIN rail with display | 1 |
| DIN rail without display (Req's.CD code 50 or 56) | 2 |

*Std. shunt resistor without field calibration = 1.10% input accuracy*
*High-accuracy shunt resistor without field calibration=0.20% Input accuracy*
*Either shunt resistor with field calibration=0.10% Input accuracy*

| Input Type | Scale Range | | | |
|---|---|---|---|---|
| RTD Pt100 IEC751 | -99.9…300.0 | °C | -99.9…572.0 | °F |
| RTD Pt100 IEC751 | -200…600 | °C | -328…1112 | °F |
| TC L  Fe-Const DIN43710 | 0…600 | °C | 32…1112 | °F |
| TC J Fe-Cu45% Ni IEC584 | 0…600 | °C | 32…1112 | °F |
| TC T Cu-CuNi | -200 …400 | °C | -328…752 | °F |
| TC K Chromel-Alumel IEC584 | 0…1200 | °C | 32…2192 | °F |
| TC S Pt10%Rh-Pt IEC584 | 0…1600 | °C | 32…2912 | °F |
| 0...50mV linear (0...20mA) | Engineering units | | | |
| 10...50mV linear (4...20mA) | Engineering units | | | |

| Output Configuration | |
|---|---|
| P.I.D. | control OP1 / alarm AL2 on OP2 |
| | control OP2 / alarm AL2 on OP1 |
| On -off | control OP1 / alarm AL2 on OP2 |
| | control OP2 / alarm AL2 on OP1 |
| Indicator with 2 alarms | alarm AL1 on OP1 / alarm AL2 on OP2 |
| | alarm AL1 on OP2 / alarm AL2 on OP1 |

| Type of Control | Safety |
|---|---|
| Reverse (AL1 active low) | 0% |
| Direct (AL1 active high) | 0% |
| Reverse (AL1 active low) | 100% |
| Direct (AL1 active high) | 100% |

| AL2 Type and Function | |
|---|---|
| Disabled | |
| Sensor break alarm | |
| Absolute | active high |
| | active low |
| Deviation | active high |
| | active low |
| Band | active out |
| | active in |