

# Custom

CONTROL  
SOLUTIONS

athenacontrols.com



ATHENA CONTROLS, INC.  
5145 Campus Drive  
Plymouth Meeting, PA 19462-1129  
U.S.A.



# TABLE OF CONTENTS

	<b>Page</b>
<b>Technology Outsourcing Program (TOP)</b> .....	<b>4</b>
<b>Series 32C</b> .....	<b>.12</b>
<b>Series 16C</b> .....	<b>.14</b>
<b>Series 18C and 25C</b> .....	<b>.16</b>
<b>Series 1ZC</b> .....	<b>.18</b>

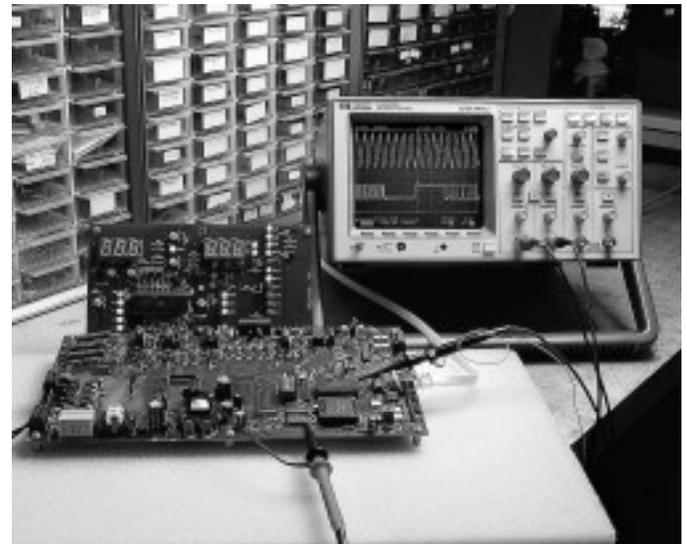
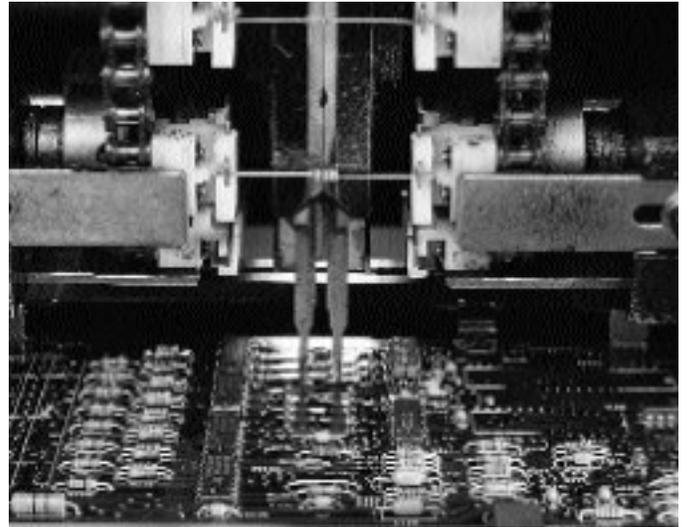
## CUSTOM TEMPERATURE CONTROL SOLUTIONS

Since 1965, Athena Controls, Inc. has been designing custom control solutions for a wide range of industries and applications. Today, we offer several alternatives designed to satisfy the varied needs of our customers.

If you're looking for a temperature or process controller with special input or output requirements, our Series C may be your solution. These controllers are available for quick delivery in sizes from 1/32 to 1/4-DIN, as well as a non-communicating model designed to be mounted on a DIN rail behind your control panel.

For fully custom-engineered control modules, our Technology Outsourcing Program (TOP) allows you to utilize our engineering skills and expertise with no out-of-pocket costs to you. It lets you concentrate your efforts on your core business and allows us to help you by doing what we do best -- design and manufacturing of reliable temperature and process controllers.

*For a free, confidential discussion of your custom engineering requirements, contact your Athena Controls representative or call toll-free in the U.S. 1-800-782-6776. Outside the U.S., please call 610-828-2490.*





## STAY ON TOP OF YOUR PRODUCT DEVELOPMENT PLANS

### ...With a Technology Outsourcing Program (TOP) from Athena Controls.

- NO upfront financial risk
- Solve key technology problems
- Reduce time to market for new products
- Free up your engineering resources for other projects
- Add improvements to existing designs
- Cut manufacturing costs
- Eliminate excess inventory

#### Industries Served

- Plastics
- Chemicals
- Instrumentation
- Scientific
- Medical
- Semiconductor
- Food
- Pharmaceutical
- Packaging

## TOP Takes the Risk out of Outsourcing Your Custom Control Design and Manufacturing.

Athena's Technology Outsourcing Program (TOP) is designed to streamline the entire process of bringing your new products to market. It optimizes your technical resources and allows you to achieve your engineering and production objectives without making an upfront financial commitment.

In its simplest terms, TOP allows you to utilize Athena's engineering skills and expertise with no out-of-pocket costs to you. It lets you concentrate your efforts on your core business and allows us to help you by doing what we do best -- temperature control.

Athena's TOP is a 3-phase program that begins with a meeting to discuss your objectives and gather the information we need to assess your project's technical requirements and the estimated total investment required for final design and production.

Next, based on your authorization to proceed, we develop a comprehensive System Requirements Specification (SRS), along with an estimated cost and delivery date. Again, there is no financial commitment on your part.

Finally, if, and only if, you're fully satisfied that our SRS meets your requirements, you'll be asked to sign a letter of intent to issue a blanket purchase order. This letter includes final pricing and delivery schedules and authorizes us to build product for field-testing and proceed with final engineering documentation. Even now, you are only responsible for paying a "not to exceed" engineering cost should you decide to cancel the project.

# Athena Controls, Inc.

## Technology Outsourcing Program (TOP)

### Overview of Elements

#### Phase I

##### Project Definition

- Mutual confidentiality agreement
- Information gathering
- Preliminary technical and cost analysis

The first step in the process, after signing a standard mutual confidentiality agreement, is to meet, discuss the project, and discern if there is a good probability that your product requirements can be met. If there is agreement, we move on to Phase II. You are under no financial obligation.

#### Phase II

##### Authorization to Proceed

- Authorization letter signed by company official
- System Requirements Specification (SRS) developed
- Estimated final cost and delivery schedule submitted

This phase ensures that there is a mutual understanding of all requirements, and requires participation of key personnel from both companies and a written commitment to proceed. However, the project may still be canceled at any time prior to Phase III without any financial obligation on your part.

#### Phase III

##### Letter of Intent to Issue a Blanket Purchase Order

- Letter of Intent signed
- Includes final pricing and delivery schedules
- Authorizes building of functional prototype and completion of final engineering documentation
- Incurs a "not-to-exceed" charge for cancellation, but **NO CHARGE** if Athena fails to meet agreed-upon specifications

Assuming we meet all of your criteria in the final product, you agree to issue a blanket purchase order to Athena for production units. If you decide to cancel the project, you are only liable for a "not-to-exceed" engineering cost. If we don't meet your specifications, there is no charge whatsoever.

## How Do You Know if TOP Is the Right Choice for You?

If you can answer "yes" to any of these situations, Athena's Technology Outsourcing Program may be just what you need to keep your new product plans on track:

- You need features and functions not found in a standard control product.
- You have some innovative ideas, which require new hardware and software.
- Your annual volume exceeds 100 units.
- You want to maintain control over your product and do not want to accept an off-the-shelf solution.
- You'd rather work with an expert in the field instead of committing in-house resources.

**SAMPLE MUTUAL CONFIDENTIALITY AGREEMENT**

Phase I.  
Mutual Confidentiality Agreement

**Technology Outsourcing Program (TOP)**

**THIS AGREEMENT**, effective as of the \_\_\_\_ day of \_\_\_\_\_, 2001, by and between **Athena Controls, Inc.**, with offices at Plymouth Meeting, PA, and \_\_\_\_\_ with offices at \_\_\_\_\_.

**WHEREAS**, both Parties have expressed both verbal and written interest in entering into a written agreement concerning (the "PROJECT"); AND

**WHEREAS**, in discussing the PROJECT, both Parties will divulge to the other certain information which each considers to be confidential and proprietary including, but not limited to certain customer and financial information and data regarding the nature and types of services rendered by each Party in the course of designing, manufacturing and selling their respective products (collectively the "Proprietary Information"); AND

**WHEREAS**, both Parties recognize the value of the other's Proprietary Information and desire to protect and keep their respective Proprietary Information confidential;

**NOW THEREFORE**, in consideration of the mutual benefit the possible PROJECT will have upon both Parties, and other good consideration, the sufficiency and receipt of which is hereby acknowledged, the Parties intending to be legally bound, agree to the following:

**ARTICLE I. RESPONSIBILITY OF PARTIES**

1.01. Both Parties will supply to the other such Proprietary Information as is necessary for open discussion of the PROJECT.

1.02. Neither Party will publish or disseminate any Proprietary Information received from the other to any third party and will maintain the Proprietary Information as confidential, unless or until:

- A. Either Party can establish it had previous knowledge of the Proprietary Information.
- B. Either Party acquires the Proprietary Information from some other party having no such disclosure agreement with either Party.
- C. Either Party can establish that the Proprietary Information was in the public domain at the time of the communication of such information;
- D. The Proprietary Information was developed by employees or agents of either Party independently of and without reference to any Proprietary Information of either Party;

1.03. In order for Proprietary Information disclosed to be subject to the provisions of this Agreement, such Proprietary Information shall be disclosed in writing or other tangible form and be clearly marked or designated as the Proprietary Information of either Party. Should Information be disclosed orally, such information shall be considered proprietary, and subject to the conditions herein if a writing summarizing what information is considered to be Proprietary Information is made and delivered either contemporaneously with such disclosure or within thirty (30) calendar days thereafter.

1.04. The Proprietary Information will be kept confidential and shall not, without the prior written consent of either Party, be disclosed by either Party, or their respective agents, representatives or employees, in any manner whatsoever, in whole or in part, and shall not be used by either Party's agents, representatives or employees, other than in connection with evaluating the PROJECT. Both Parties also agree to reveal the Proprietary Information only to their agents, representatives, and employees who need to know the Proprietary Information for the purpose of evaluating the PROJECT, who are informed by either Party of the confidential nature of the Information and who shall agree to act in accordance with the terms and conditions of this Agreement. Both Parties agree to return the other Party's Proprietary Information immediately upon written request from the other Party.

1.05. Without both Parties prior written consent, neither Party and their respective agents, representatives and employees will disclose to any person the fact that the Proprietary Information has been made available, that discussions or negotiations are taking place or have taken place concerning the PROJECT or any of the terms, conditions of other facts with respect to any such possible PROJECT.

**ARTICLE II. CHOICE OF LAW**

This Agreement will be governed and construed by the laws of the State of \_\_\_\_\_ and any suit or claim relating to this Agreement shall be brought within the State of \_\_\_\_\_.

**ARTICLE III. ENTIRE AGREEMENT**

This Agreement contains the entire agreement and understanding between the Parties. No Representations, agreements, understandings, either written or oral, not contained herein, shall be of any force or effect. No change or modification to this Agreement shall be valid or binding unless it is in writing and signed by the party against whom the waiver is sought to be enforced.

THE PARTIES HAVING READ, UNDERSTOOD, AND AGREED to the foregoing, have signed below:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Name  
Title

\_\_\_\_\_  
Name  
Title

**SAMPLE AUTHORIZATION TO PROCEED AGREEMENT**

**Phase II.  
Authorization to Proceed**

**Technology Outsourcing Program (TOP)**

Company: \_\_\_\_\_ Date: \_\_\_\_\_  
Project Manager: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Thank you for your interest in the Athena Controls Technology Outsourcing Program (TOP). We have completed the Preliminary Definition of your project and have determined that it is feasible for us to provide you with a product that will meet your application requirements at an estimated price of \$ \_\_\_\_\_ per unit. This estimate is based on available information from \_\_\_\_\_ dated \_\_\_\_\_.

Company Name

The prices stated above are only an estimate and final pricing will be given to \_\_\_\_\_ at the completion of Phase III.

Company Name

The next step in our TOP program is to proceed to Phase III. In this Phase, there are no direct costs to you; however, it will require participation of key personnel from your company, i.e., engineering, production, and possibly marketing.

This letter authorizes Athena Controls to proceed to Phase III of the program, which involves the development of a comprehensive Systems Requirements Specification (SRS) document, as well as an estimated final cost and a timetable for delivery of a working prototype unit. It is understood, however, that in the event Athena is unable to develop a comprehensive systems requirements specification for this project, or does not feel that it is economical to do so, Athena will have no obligation or liability to \_\_\_\_\_.

Company Name

For Athena Controls, Inc.:

For \_\_\_\_\_:

Company Name

(Officer of Company and Title)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**SAMPLE LETTER OF INTENT**

**Phase III.  
Letter of Intent to Issue a Blanket Order**

**Technology Outsourcing Program (TOP)**

Company: \_\_\_\_\_ Date: \_\_\_\_\_  
Project Manager: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

We are pleased to advise you that we have completed our final engineering specifications for the following project:

Project: \_\_\_\_\_.

Upon receipt of a signed copy of this Letter of Intent, Athena Controls agrees to develop and provide \_\_\_\_\_ with a prototype product which shall fulfill the design

Company Name

and functional requirements of the attached System Requirements Specification (SRS) document, and to offer this product in a full production version at a unit price of \$ \_\_\_\_\_ (± \$ \_\_\_\_\_), within a timeframe not to exceed \_\_\_\_\_ from the execution date of this document or purchase order.

After having a reasonable opportunity to evaluate the prototype product, \_\_\_\_\_ will agree to either: \_\_\_\_\_  
Company Name

- 1) Enter into a Blanket Purchase Order Agreement with Athena Controls to supply this product for a period of at least \_\_\_ year(s), and with a minimum required purchase of \_\_\_ units; or
- 2) Terminate the project and reimburse Athena Controls for all engineering costs and administrative fees, related to the preliminary work performed by Athena, which sum shall not exceed \$ \_\_\_\_\_. If Athena Controls is unable to meet your company's conditions as described in the attached SRS, or if Athena is unable to meet your company's conditions at the above stated price, then \_\_\_\_\_ will have no financial obligation with regard to any \_\_\_\_\_ preliminary work performed by Athena. Likewise, Athena will have absolutely no obligation or liability to \_\_\_\_\_ in the event Athena determines \_\_\_\_\_ that it is not able to meet the conditions at the above quoted price.

Company Name

Company Name

The signatures below indicate the understanding and acceptance of the terms stated in this Letter of Intent by both parties.

For Athena Controls, Inc.:

For \_\_\_\_\_:

\_\_\_\_\_  
Date: \_\_\_\_\_

\_\_\_\_\_  
(Officer of Company and Title)  
Date: \_\_\_\_\_

# TABLE OF CONTENTS

## SYSTEM REQUIREMENTS SPECIFICATION (SRS)

1	DOCUMENT INFORMATION	4
1.1	CHANGE INFORMATION	4
1.2	READERS' GUIDE	4
2	INTRODUCTION	5
2.1	PURPOSE	5
2.2	DEFINITIONS, ACRONYMS AND ABBREVIATIONS	5
2.3	REFERENCES	5
2.4	OVERVIEW	5
3	HARDWARE SPECIFICATIONS	6
3.1	ENVIRONMENTAL OPERATING CONDITIONS	6
3.2	SENSOR INPUTS (FIVE ZONES)	6
3.3	AMBIENT COMPENSATION	6
3.4	OTHER LINEAR INPUTS	6
3.5	LOGIC INPUTS	7
3.6	OUTPUTS	7
3.7	SERIAL BOARD COMMUNICATIONS	7
3.8	FEATURES	8
3.9	POWER SUPPLY	8
3.10	DISPLAY BOARD	8
3.11	CONNECTORS	8
4	SOFTWARE REQUIREMENTS	12
4.1	OVERVIEW	12
4.2	INITIAL POWER UP	12
4.3	OPERATING MODES	14
4.3.1	Clear Mode	16
4.3.2	Program Mode	16
4.3.3	Factory Mode	19
4.3.3.1	Factory Mode Menus	21
4.3.3.1.1	'CONFIG' Menu	22
4.3.3.1.1.1	'MODEL' Service	22
4.3.3.1.1.2	'PREHEAT' Service	24
4.3.3.1.2	'CAL' Menu	25
4.3.3.1.2.1	'TC' Service	26
4.3.3.1.2.2	'HEIGHT' Service	27
4.3.3.1.3	'TST.COOK' Menu	28
4.3.3.1.3.1	'MENU x' Services	28
4.3.3.1.4	'DIAG' Menu	29
4.3.3.1.4.1	'START' Service	29
4.3.3.1.5	'DEFAULT' Menu	31
4.3.3.1.6	'PSWD' Menu	32
4.3.3.1.7	'TC READ' Menu	33
4.3.4	Menu/Cook Mode	34
4.3.4.1	Executing A Menu	35
4.3.4.2	Displaying the Menu Parameters	37
4.3.4.3	Terminating A Menu	38
4.4	PROGRAM AND FACTORY MODE PASSWORDS	39

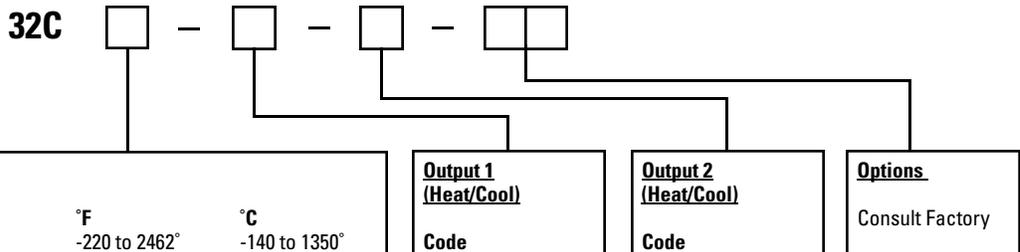
# SERIES 32C

## 1/32 DIN Universal Input Controller

- Thermocouple, RTD, Voltage or Current Input
- Auto-Tuning, Heat or Cool
- Field-Configurable – Heat or Cool Outputs
- Dual Output/Alarm Capabilities
- On/Off through Full PID Operation (P, PI, PD, PID)
- NEMA 4X (IP65) Dust and Splash-Proof Front Panel
- Bumpless Auto/Manual Transfer
- Field-Configurable Process and Deviation Alarms (Normal and Latching)
- Alarm Inhibit Mode
- DIN Standard Case Depth and Panel Cutout
- Special and Custom Options Available



## Ordering Information



Input Calibration			
Code	Input	°F	°C
T*	K"TC"	-220 to 2462°	-140 to 1350°
	J"TC"	-398 to 1400°	-100 to 760°
	T"TC"	-202 to 752°	-130 to 400°
R*	100 ohm RTD	-328 to 1562°	-200 to 850°
	100 ohm RTD (Decimal)	-199.0 to 392.0°	-128.8 to 200.0°
L*	Linear Input 10 to 50 mV 4 to 20 mA 0 to 50 mV 0 to 20 mA	Scaleable	
U	Universal		

\*Factory set up. When changing input, re-calibration is required.

Output 1 (Heat/Cool)	
Code	
0	= None
B	= Relay
S	= Pulsed (Logic)
T	= SS Relay, 1 A

Output 2 (Heat/Cool)	
Code	
0	= None
S	= Pulsed (Logic)
T	= SS Relay, 1 A

Options
Consult Factory





# SERIES 32C TEMPERATURE/PROCESS CONTROLLER

## OPERATING LIMITS

Line Voltage	85 to 265 V, 50/60 Hz 120 to 375 Vdc, (auto polarity)
Power Consumption	Less than 6 VA (instrument)
Operating Temperature	32 to 140°F (0 to 60°C)
Humidity Tolerance	90% R.H. maximum, non-condensing

## PERFORMANCE

Accuracy	± 0.2% of FS, ± one digit
Setpoint Resolution	1 count/0.1 count
Repeatability	± 1.0 count
Temperature Stability	5 µV/°C maximum
TC Cold End Tracking	0.05°C/°C ambient
Noise Rejection	Common mode > 100 dB Series mode > 70 dB
Process Sampling	3.5 Hz (270 ms)

## CONTROL CHARACTERISTICS

Setpoint Limits	User Configurable
Alarms	Adjustable for high/low; process or deviation
Rate (Derivative)	0 to 2400 sec
Reset (Integral)	0 to 9600 sec
Cycle Time	0.3 to 120 sec
Proportional Band	1 to FS
Deadband	1 to FS
Control Hysteresis	1 to FS
Autotune	Operator-initiated from front panel
Manual Control	Operator-initiated from front panel

## INPUTS

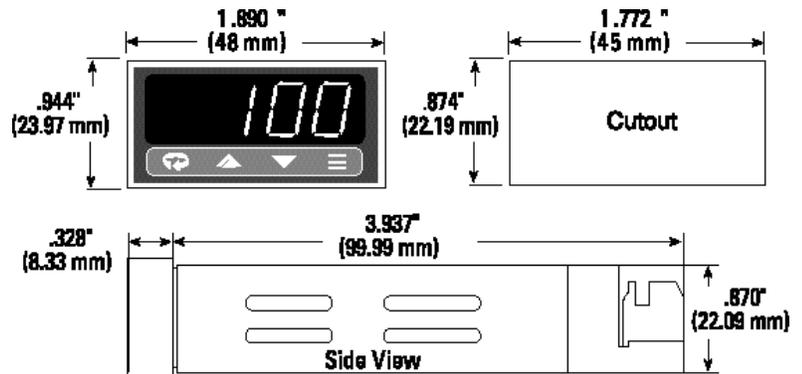
Thermocouple	J, K, T Maximum lead resistance, 100 ohms for rated accuracy
RTD	2-wire platinum, 100 ohms at 0°C, DIN curve standard (0.00385)
Linear	Current and voltage
Engineering Units	Scaleable: -1999 to 9999
Decimal Position	Selectable: none, 1/10, 1/100

## OUTPUTS

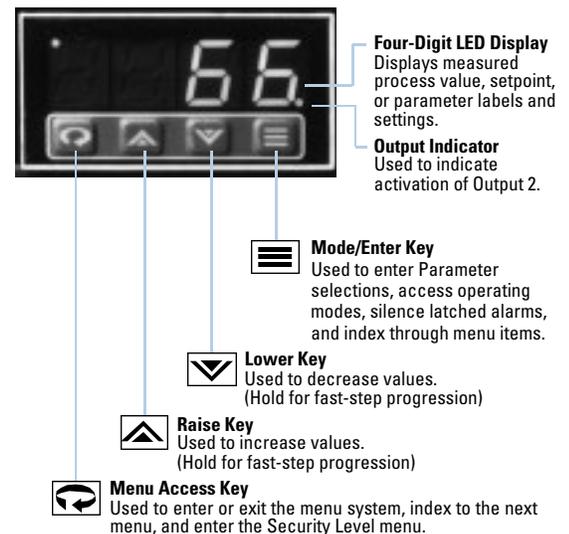
B	Relay 5 A @ 120 Vac; 5 A @ 240 Vac
S	5 Vdc pulsed
T	Solid-state relay, 1 A

## MECHANICAL CHARACTERISTICS

Display	LED, 4-digit, 10 mm
Front Panel Rating	NEMA 4X (IP65)
Connections	Input and output via removable barrier strip



**Output Indicator**  
Used to indicate  
activation of Output 1.



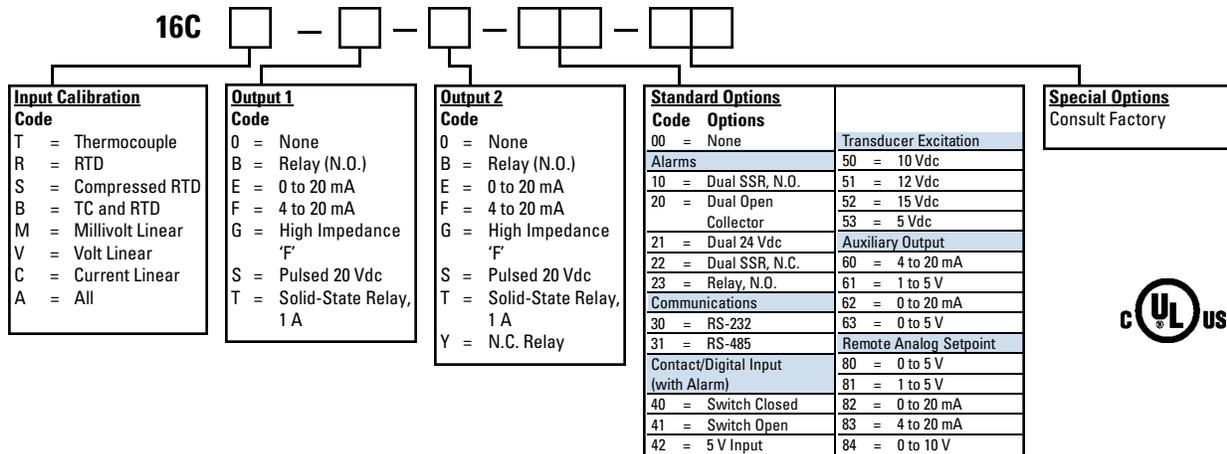
# SERIES 16C

## 1/16 DIN Temperature/ Process Controller

- Field-Configurable Universal Inputs
- User-Selectable Ramp to Setpoint
- 8-Level Ramp/Soak Control
- Bumpless Auto/Manual Transfer
- NEMA 4X (IP65) Dust and Splash-Proof Front Panel
- Decimal Display in 0.1° for Measured Temperatures Under 1000° F or C
- On/Off through Full PID Operation (P, PI, PD, PID)
- Auto-Tuning, Direct or Reverse Acting (Field-Configurable)
- Adjustable Hysteresis and Deadband
- Outputs Configurable as Alarms
- Field-Configurable Process or Deviation Alarms; Latching or Non-Latching; Band and Inverse Band
- Dual Output/Dual Alarm Capabilities
- UL, cUL, and CE Approvals
- Options Include Serial Communications (RS-232, RS-485), Remote Analog Setpoint, Multi-Function Contact/Digital Input, Transducer Excitation, and Auxiliary Output.
- Special and Custom Options Available



## Ordering Information



### Range Information

Input	Range	Input	Range
"B"	32 to 3308°F (0 to 1820°C)	"R"	-58 to 3214°F (-50 to 1768°C)
"C"	32 to 4199°F (0 to 2315°C)	"S"	-58 to 3214°F (-50 to 1768°C)
"E"	-238 to 1832°F (-150 to 1000°C)	"T"	-454 to 752°F (-270 to 400°C)
"J"	-328 to 1400°F (-200 to 760°C)	Platinel® II	-148 to 2250°F (-100 to 1232°C)
"K"	-454 to 2462°F (-270 to 1354°C)	100 ohm RTD	-328 to 1562°F (-200 to 850°C)
"N"	-450 to 2372°F (-268 to 1300°C)	100 ohm RTD (Decimal)	-328.0 to 707.0°F (-200.0 to 375.0°C)
"NNM"	32 to 2570°F (0 to 1410°C)		



# SERIES 16C TEMPERATURE/PROCESS CONTROLLER

## OPERATING LIMITS

Ambient Temperature	32° F to 131° F (0° C to 55° C)
Relative Humidity Tolerance	90%, non-condensing
Power	100-250 V 125 to 300 Vdc 24 Vac/Vdc optional
Power Consumption	Less than 6 VA

## PERFORMANCE

Accuracy	±0.20% of full scale (±0.10% typical), ±1 digit
Setpoint Resolution	1 count / 0.1 count
Repeatability	±1 count
Temperature Stability	5 µV/°C (maximum)
TC Cold-End Tracking	0.05°C/°C ambient
Noise Rejection	100 dB common mode
Process Sampling	10 Hz (100 ms)

## CONTROL CHARACTERISTICS

Alarms	Adjustable for high/low; selectable process, or deviation
Proportional Band	2 to span of sensor
Integral	0 to 9600 seconds
Derivative	0 to 2400 seconds
Cycle Time	0 = 200 ms; 1 to 120 seconds
Control Hysteresis	1 to span of sensor
Autotune	Operator initiated from front panel
Manual Control	Operator initiated from front panel

## INPUTS

Thermocouple	B, C, E, J, K, N, NNM, R, S, T, Platinel® II Maximum lead resistance 100 ohms for rated accuracy
RTD	Platinum 2- and 3-wire, 100 ohms at 0°C, DIN curve standard (0.00385)
Linear	0-50 mV/10-50 mV, 0-20 mA/4-20 mA, 0-10 mV/0-50 mV, 0-100 mV, 0-1 V/0-5 V, 0-10 V, 1-5 V

## OUTPUTS

B	5A/3A (120/240 Vac) relay, normally open
E	0-20 mA
F	4-20 mA, full output to load with 500 ohm impedance, max.
G	High impedance 'F'
S	20 Vdc pulsed output

T	Solid-state relay, 1A
Y	5A/3A (120/240 Vac) relay, but normally closed (output 2 only).

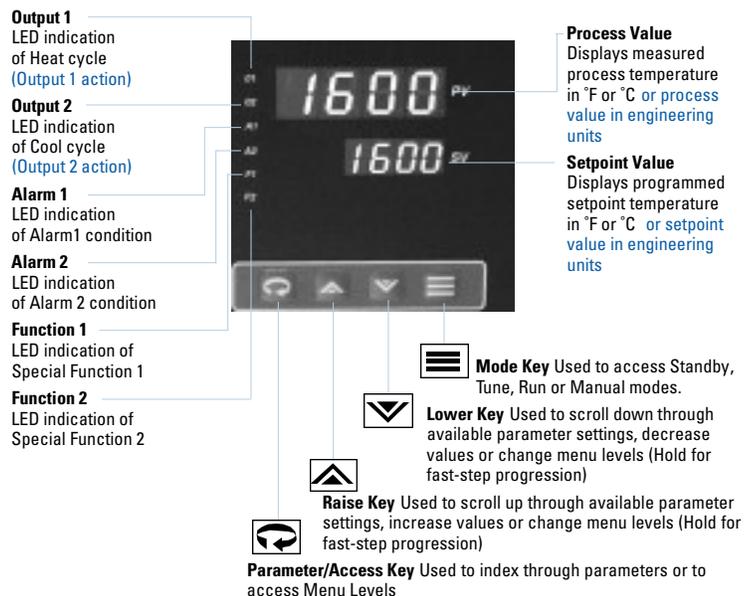
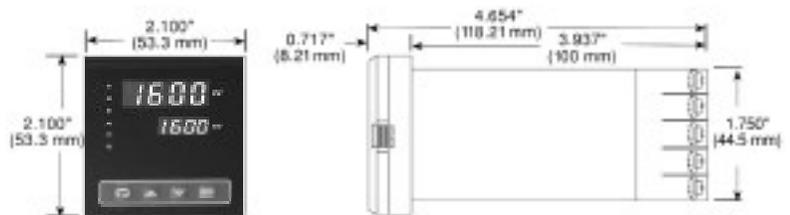
## ALARM TYPE

With dual alarm option: See ordering code.

## MECHANICAL CHARACTERISTICS

Display	Dual, 4-digit 0.36" (9.2 mm) LED display Process Value: orange Setpoint Value: green
Numeric Range	-1999 to 9999
Front-Panel Cutout	1.771" x 1.771" (45 mm x 45 mm)
Depth Behind Panel	3.937" (100 mm)
Front-Panel Rating	NEMA 4X (IP65)
Connections	Screw terminals

Specifications subject to change without notice.



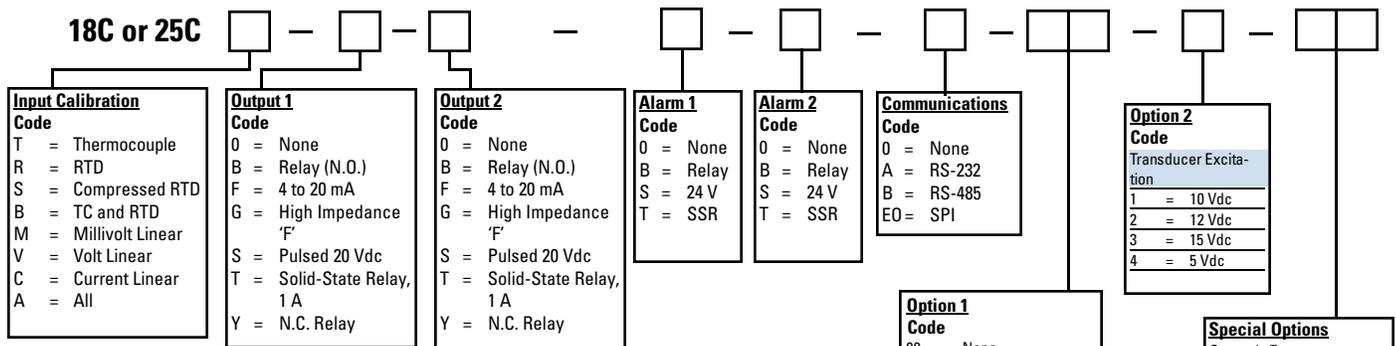
# SERIES 18C and 25C

## Temperature/Process Controllers

- 1/8-DIN (18C) or 1/4-DIN (25C) Models
- Field-Configurable Universal Inputs
- User-Selectable Ramp to Setpoint
- 8-Level Ramp/Soak Control
- Bumpless Auto/Manual Transfer
- NEMA 4X (IP65) Dust and Splash-Proof Front Panel
- Decimal Display in 0.1° for Measured Temperatures Under 1000° F or C
- On/Off through Full PID Operation (P, PI, PD, PID)
- Auto-Tuning, Direct or Reverse Acting (Field-Configurable)
- Adjustable Hysteresis and Deadband
- Outputs Configurable as Alarms
- Field-Configurable Process or Deviation Alarms; Latching or Non-Latching; Band and Inverse Band
- Dual Output/Dual Alarm Capabilities
- Options Include Serial Communications (RS-232, RS-485), Remote Analog Setpoint, Multi-Function Contact/Digital Input, Transducer Excitation, and Auxiliary Output.
- Athena + (Standard), SPI, Engel/Arburg Communications Protocols
- Special and Custom Options Available



## Ordering Information



Option 1 Code	Auxiliary Output
00 = None	PA = 4 to 20 mA
	PB = 1 to 5 V
	PC = 0 to 20 mA
	PD = 0 to 5 V
Remote Analog Setpoint	
SA = 0 to 5 V w/ switch	
SB = 1 to 5 V w/ switch	
SC = 0 to 20 mA w/ switch	
SD = 4 to 20 mA w/ switch	
SE = Switch only	
SF = 1 to 10 Vdc w/ switch	

**Special Options**  
Consult Factory

### Range Information

Input	Range	Input	Range
"B"	32 to 3308°F (0 to 1820°C)	"R"	-58 to 3214°F (-50 to 1768°C)
"C"	32 to 4199°F (0 to 2315°C)	"S"	-58 to 3214°F (-50 to 1768°C)
"E"	-238 to 1832°F (-150 to 1000°C)	"T"	-454 to 752°F (-270 to 400°C)
"J"	-328 to 1400°F (-200 to 760°C)	Platinel® II	-148 to 2250°F (-100 to 1232°C)
"K"	-454 to 2462°F (-270 to 1354°C)	100 ohm RTD	-328 to 1562°F (-200 to 850°C)
"N"	-450 to 2372°F (-268 to 1300°C)	100 ohm RTD (Decimal)	-328.0 to 707.0°F (-200.0 to 375.0°C)
"NNM"	32 to 2570°F (0 to 1410°C)		





# SERIES 18C & 25C TEMPERATURE/PROCESS CONTROLLERS

## OPERATING LIMITS

Temperature	32° F to 131° F (0° C to 55° C)
Humidity	90%, non-condensing
Power	100-250 V 50/60 Hz 125 to 300 Vdc 24 Vac/24 Vdc optional
Power Consumption	Less than 6 VA

## PERFORMANCE

Accuracy	±0.20% of full scale (±0.10% typical), ±1 digit
Setpoint Resolution	1 count / 0.1 count
Repeatability	±1 count
Temperature Stability	5 µV/°C (maximum)
TC Cold-End Tracking	0.05°C/°C ambient
Noise Rejection	100 dB common mode
Process Sampling	10 Hz (100 ms)

## CONTROL CHARACTERISTICS

Alarms	Adjustable for high/low; selectable process, or deviation
Proportional Band	2 to span of sensor
Integral	0 to 9600 seconds
Derivative	0 to 2400 seconds
Cycle Time	0 = 200 ms; 1 to 120 seconds
Control Hysteresis	1 to span of sensor
Autotune	Operator initiated from front panel
Manual Control	Operator initiated from front panel

## INPUTS

Thermocouple	B, C, E, J, K, N, NNM, R, S, T, Platinel® II Maximum lead resistance 100 ohms for rated accuracy
RTD	Platinum 2- and 3-wire, 100 ohms at 0°C, DIN curve standard (0.00385)
Linear	0-50 mV/10-50 mV, 0-20 mA/4-20 mA, 0-10 mV/0-50 mV, 0-100 mV, 0-1 V/0-5 V, 0-10 V, 1-5 V

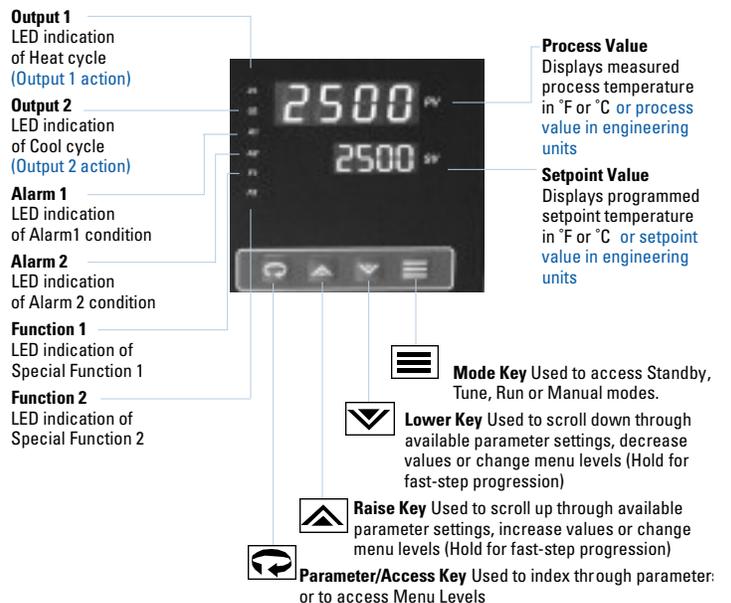
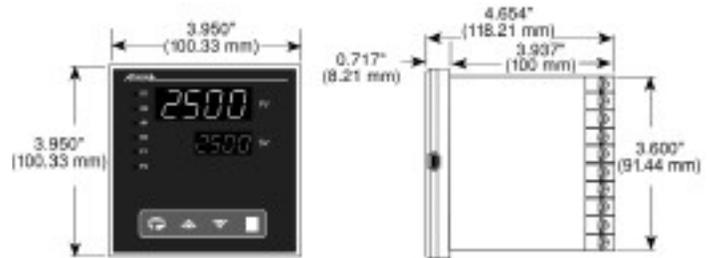
## OUTPUTS

B	5A/3A (120/240 Vac) relay, normally open
F	4-20 mA, full output to load with 500 ohm impedance, max.
G	High impedance 'F'
S	20 Vdc pulsed output
T	Solid-state relay, 1 A
Y	5A/3A (120/240 Vac) relay, but normally closed (output 2 only)

## MECHANICAL CHARACTERISTICS

Display	Dual, 4-digit 0.36" (9.2 mm) LED display Process Value: orange Setpoint Value: green
Numeric Range	-1999 to 9999
Front-Panel Cutout	1.771" x 1.771" (45 mm x 45 mm)
Depth Behind Panel	3.937" (100 mm)
Front-Panel Rating	NEMA 4X (IP65)
Connections	Screw terminals
Contacts	Twin bifurcated (gold optional)

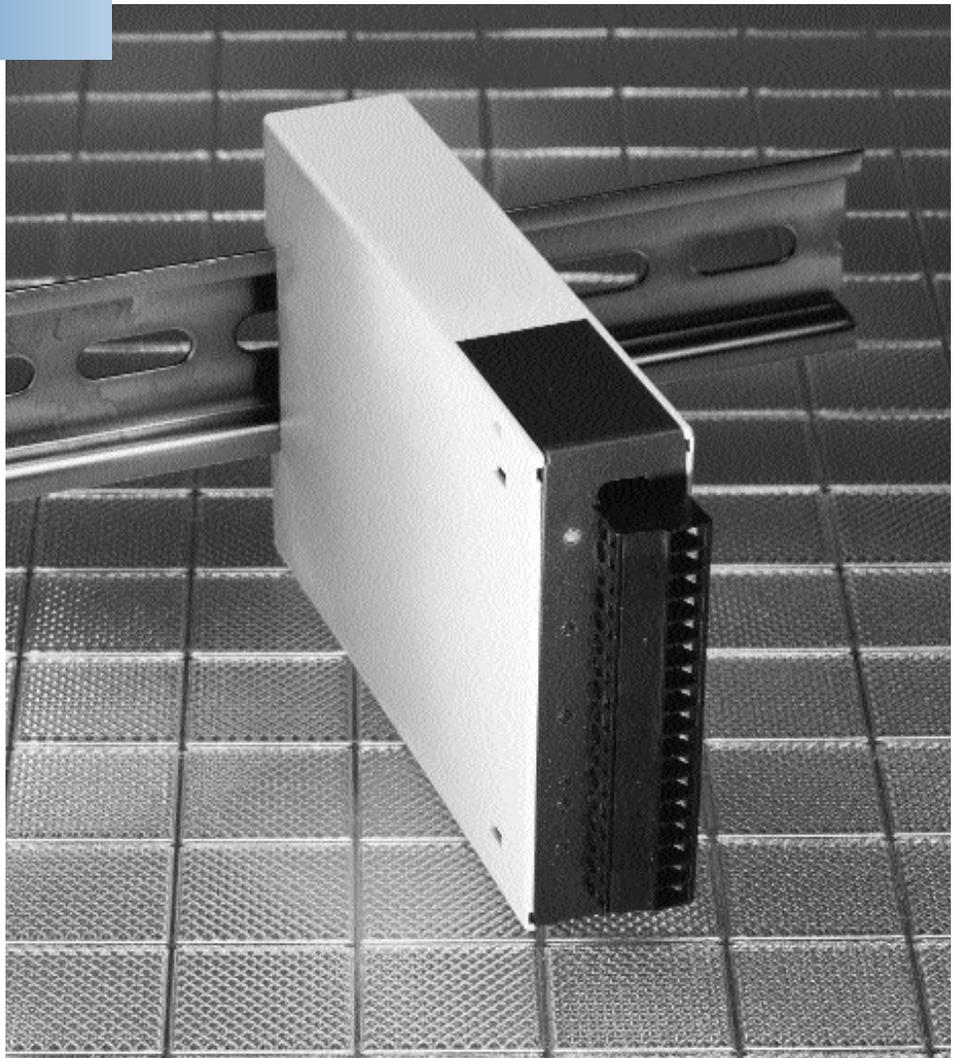
Specifications subject to change without notice.



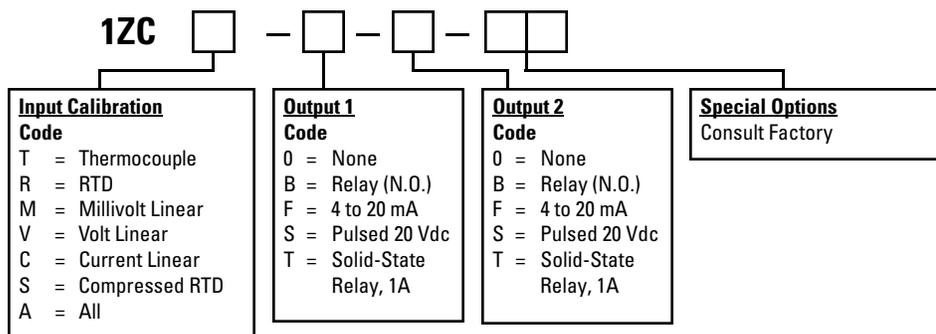
# SERIES 1ZC

## DIN Rail Type Temperature/Process Controller

- Miniature DINRail Mountable Enclosure Stackable to Required Number of Zones
- Each Zone Independently Powered 100-250 V 50/60 Hz (24 Vac/dc available)
- RS-485 Serial Communications Using Athena + Protocol
- Easy Communications Bus Wiring
- Auto Tune
- Each Output Universally Configurable as Heat/Cool or Alarm
- Accepts RTD (2 and 3 Wire), Thermocouple, and Linear Inputs
- Loop Break Alarm
- Pluggable Terminal Block for Easy Wiring and Controller Replacement
- Optically Isolated Inputs and Outputs



## Ordering Information



Range Information			
Input	Range	Input	Range
"B"	32 to 3308°F (0 to 1820°C)	"R"	-58 to 3214°F (-50 to 1768°C)
"C"	32 to 4199°F (0 to 2315°C)	"S"	-58 to 3214°F (-50 to 1768°C)
"E"	-238 to 1832°F (-150 to 1000°C)	"T"	-454 to 752°F (-270 to 400°C)
"J"	-328 to 1400°F (-200 to 760°C)	Platine!® II	-148 to 2250°F (-100 to 1232°C)
"K"	-454 to 2462°F (-270 to 1354°C)	100 ohm RTD	-328 to 1562°F (-200 to 850°C)
"N"	-450 to 2372°F (-268 to 1300°C)	100 ohm RTD (Decimal)	-328.0 to 707.0°F (-200.0 to 375.0°C)
"NNM"	32 to 2570°F (0 to 1410°C)		





# SERIES 1ZC TEMPERATURE/PROCESS CONTROLLER

## OPERATING LIMITS

Ambient Temperature	32° F to 131° F (0° C to 55° C)
Relative Humidity Tolerance	90%, non-condensing
Power	100-250 V 50/60 Hz (single-phase) 125 to 300 Vdc 24 Vac/Vdc (optional)

Power Consumption	Less than 6 VA
-------------------	----------------

## PERFORMANCE

Accuracy	±0.20% of full scale (±0.10% typical), ±1 digit
Setpoint Resolution	1 count / 0.1 count
Repeatability	±1 count
Temperature Stability	5 µV/°C (maximum)
TC Cold-End Tracking	0.05°C/°C ambient
Noise Rejection	100 dB common mode
Process Sampling	10 Hz (100 ms)

## CONTROL CHARACTERISTICS

Proportional Band	2 to span of sensor
Integral	0 to 9600 seconds
Derivative	0 to 2400 seconds
Cycle Time	0 = 200 ms; 1 to 120 seconds
Control	
Hysteresis	1 to span of sensor
Autotune	Operator initiated
Manual Control	Operator initiated

## INPUTS

Thermocouple	B, C, E, J, K, N, NNM, R, S, T, Platinel® II Maximum lead resistance 100 ohms for rated accuracy
RTD	Platinum 2- and 3-wire, 100 ohms at 0°C, DIN curve standard (0.00385)
Linear	0-50 mV/10-50 mV, 0-20 mA/4-20 mA, 0-10 mV/0-50 mV, 0-100 mV, 0-1 V/0-5 V, 0-10 V, 1-5 V

Specifications subject to change without notice.

## OUTPUTS

B	5A/3A (120/240 Vac) relay, normally open
F	4-20 mA, full output to load with 500 ohm impedance, max.
S	20 Vdc pulsed output
T	Solid-state relay, 1 A

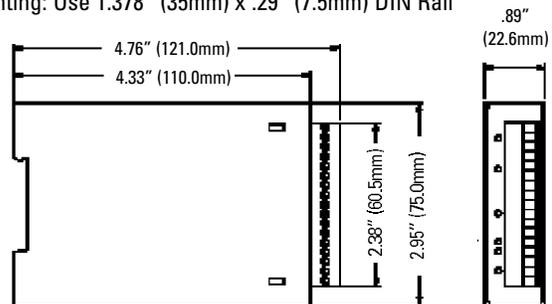
## COMMUNICATIONS TYPE

RS-485 Standard

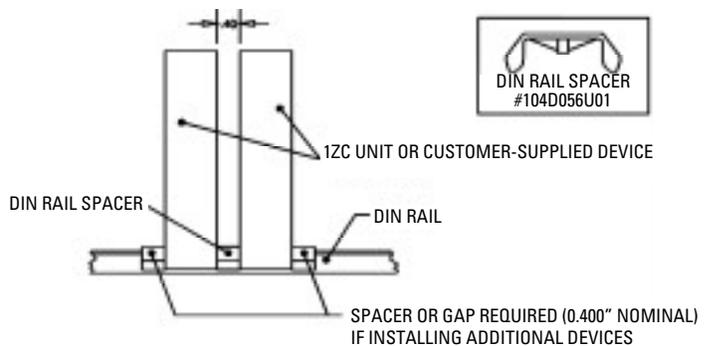
## MECHANICAL CHARACTERISTICS

Display	LED displays for Sensor Error, RXD, TXD, Output 1, Output 2, Power/Run
Connections	Screw terminals

Mounting: Use 1.378" (35mm) x .29" (7.5mm) DIN Rail



## MOUNTING CLEARANCE REQUIREMENTS



## 1ZC CONTACT IDENTIFICATION

### Contact #/Description

1	Sensor (-) T/C, RTD, or Process
2	Sensor (+) T/C, RTD, or Process
3	Sensor Bias for RTD
4	Comms RS485 + ("A") I/O line bidirectional
5	Comms RS485 - ("B") I/O line bidirectional
6	Output 1 Relay, N.O., SS relay: Load; Process (+)
7	Output 1 Relay, common, SS relay: Load; Process: (-)
8	Output 2 Relay, N.O., SS relay: Load; Process (+)
9	Output 2 Relay, common, SS relay: Load; Process: (-)
10	Power Input, L2 (reference only, no polarity required)
11	Power Input, L1 (reference only, no polarity required)

## ALSO FROM ATHENA CONTROLS...

### Universal Digital Controllers



### Power Controls



### Vintage Controllers



### Power Handlers



### Hot Runner Controllers



### Analog Controllers



### Tudor™ Temperature Sensors



Athena Controls, Inc. • 5145 Campus Drive • Plymouth Meeting, PA 19462 • Toll-Free in U.S.: 800.782.6776  
Tel: 610.828.2490 • Fax: 610.828.7084 • E-mail: [sales@athenacontrols.com](mailto:sales@athenacontrols.com) • Internet: [athenacontrols.com](http://athenacontrols.com)