

# MODEL IAMS – INTELLIGENT UNIVERSAL SIGNAL CONDITIONING MODULE



- UNIVERSAL INPUT, PROCESS, mA DC, VDC, TC, 100 (RTD, POTENTIOMETER, AND LINEAR RESISTANCE)
- UNIVERSAL POWER SUPPLY, 21.6 to 253 VAC/ 19.2 to 300 VDC
- 3-WAY ISOLATION (POWER/SIGNAL/OUTPUT)
- CHOOSE SETPOINTS AND/OR ANALOG OUTPUT MODELS
- PROGRAMMING/DISPLAY MODULE (NOT INCLUDED)
- PROGRAMMING AVAILABLE IN SEVEN DIFFERENT LANGUAGES

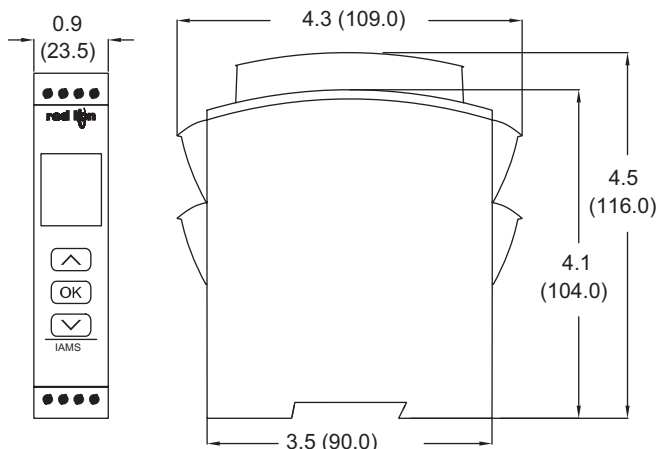


## GENERAL DESCRIPTION

The IAMS — Universal Signal Conditioners unmatched capability provides users the ultimate in flexibility. As a signal conditioner, the unit provides complete isolation and conversion capability to satisfy almost any application. The Universal Input accepts Process, DC Current, DC Voltage, Thermocouples, RTDs, Potentiometers, and Linear Resistance signals allowing the module to be connected to most sensors. The setpoint model allows dual setpoint control capability through dual Form A relays. The analog model provides a retransmitted analog signal. A third model provides both analog and dual setpoint control capability. The power supply is universal, accepting 21.6 to 253 VAC/ 19.2 to 300 VDC as its power source. Add the optional programming module and the unit is easily programmed through menu style programming. The module can also be used to provide a display of the process variable when it is not being used for programming.

The IAMS features well over 100 combinations of inputs to outputs configurations. Input specific terminals allow for the various signals and sensors to be connected to the unit while the input ranges and resolutions are adjusted in the input programming loop of the unit. The menu style programming allows the user quick and easy set-up by using the PGMMOD, programming module. The module is required to program the IAMS. However, if you are using more than one IAMS, only one programming module is required. The module can store programming from one unit and load it to a second unit reducing set-up time for multiple installations. When the programming module is not being used for programming, it can indicate the input parameters.

## DIMENSIONS In inches (mm)



The unit's overall full scale accuracy typically exceeds 0.1 % depending on the range selection and scaling. The microprocessor based design provides ease of field scaling and the onboard E2PROM stores scaling values for future recall. All units come factory calibrated for all input and output ranges. Factory or custom field scaling can be selected in the Advanced programming loop. The IAMS can be recalibrated in the field if desired.

DIN rail mounting saves time and panel space. The units are equipped with mounting feet to attach to top hat profile rail according to EN50022 – 35 x 7.5 and 35 x 15.

## SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



**CAUTION: Risk of Danger**  
Read complete instructions prior to installation and operation of the unit.



**CAUTION: Risk of electric shock.**



**INSTALLATION**

## WARNING

To keep the safety distances, the relay contacts on the devices must not be connected to both hazardous and non-hazardous voltages at the same time.

The IAMS devices must be mounted on a DIN rail according to DIN 46277.

## ORDERING INFORMATION

| MODEL NO. | DESCRIPTION                                                                 | PART NUMBER |
|-----------|-----------------------------------------------------------------------------|-------------|
| IAMS      | Intelligent Universal Signal Conditioner with Analog Output                 | IAMS0001    |
|           | Intelligent Universal Signal Conditioner w/Dual Setpoints                   | IAMS0010    |
|           | Intelligent Universal Signal Conditioner w/Analog Output and Dual Setpoints | IAMS0011    |
|           | Programming Display Module (Not Included) *                                 | PGMMOD00    |

\* At least one module is required to program a unit or a series of units.

## SPECIFICATIONS

- 1. DISPLAY:** See Display/ Programming Module
- 2. POWER:**  
AC Power: 21.6 to 253 VAC, 50/60 Hz  
DC Power: 19.2 to 300 VDC,
- 3. CONSUMPTION:**  $\leq 2.5$  W
- 4. FUSE:** 400 mA SB/250 VAC
- 5. ISOLATION:** Between input, supply and outputs - 2.3 kVAC/250 VAC
- 6. INPUTS:**

### Current Input:

Programmable Ranges: 0 to 20 and 4 to 20 mA DC  
Measurement range: 0 to 20 mA DC  
Input resistance: Nom. 20  $\Omega$  + PTC 50  $\Omega$   
Sensor error detection: 4 to 20 loop break, yes  
Supply Voltage: 16-25 VDC, 20 mA max (Terminal 43 and 44)

### Voltage Input:

Programmable Ranges: 0 to 1, 0.2 to 1, 0 to 5, 1 to 5, 1 to 10, and 2 to 10 VDC  
Measurement range: 0 to 12 VDC  
Input resistance: Nom. 10 M $\Omega$

### Thermocouple Inputs:

Thermocouple Type: B, E, J, K, L, N, R, S, T, U, W3, W5, and LR  
Cold Junction Compensation: via internally mounted sensor  $< \pm 1.0$   $^{\circ}\text{C}$   
Sensor Error Detection: All TC types, yes  
Sensor Error Current: 2  $\mu\text{A}$  nominal, 0  $\mu\text{A}$  = error detected

| TYPE | MIN. VALUE              | MAX. VALUE               | STANDARD     |
|------|-------------------------|--------------------------|--------------|
| B    | +400 $^{\circ}\text{C}$ | +1820 $^{\circ}\text{C}$ | IEC 60584-1  |
| E    | -100 $^{\circ}\text{C}$ | +1000 $^{\circ}\text{C}$ | IEC 60584-1  |
| J    | -100 $^{\circ}\text{C}$ | +1200 $^{\circ}\text{C}$ | IEC 60584-1  |
| K    | -180 $^{\circ}\text{C}$ | +1372 $^{\circ}\text{C}$ | IEC 60584-1  |
| L    | -200 $^{\circ}\text{C}$ | +900 $^{\circ}\text{C}$  | DIN 43710    |
| N    | -180 $^{\circ}\text{C}$ | +1300 $^{\circ}\text{C}$ | IEC 60584-1  |
| R    | -50 $^{\circ}\text{C}$  | +1760 $^{\circ}\text{C}$ | IEC 60584-1  |
| S    | -50 $^{\circ}\text{C}$  | +1760 $^{\circ}\text{C}$ | IEC 60584-1  |
| T    | -200 $^{\circ}\text{C}$ | +400 $^{\circ}\text{C}$  | IEC 60584-1  |
| U    | -200 $^{\circ}\text{C}$ | +600 $^{\circ}\text{C}$  | DIN 43710    |
| W3   | 0 $^{\circ}\text{C}$    | +2300 $^{\circ}\text{C}$ | ASTM E988-90 |
| W5   | 0 $^{\circ}\text{C}$    | +2300 $^{\circ}\text{C}$ | ASTM E988-90 |
| LR   | -200 $^{\circ}\text{C}$ | +800 $^{\circ}\text{C}$  | GOST 3044-84 |

### RTD, Linear Resistance, Potentiometer Inputs

RTD Types: Pt10, Pt20, Pt50, Pt100, Pt200, Pt250, Pt300, Pt400, Pt500, Pt1000, Ni50, Ni100, Ni120, and Ni1000

| INPUT TYPE    | MIN. VALUE              | MAX. VALUE              | STANDARD  |
|---------------|-------------------------|-------------------------|-----------|
| Pt100         | -200 $^{\circ}\text{C}$ | +850 $^{\circ}\text{C}$ | IEC60751  |
| Ni100         | -60 $^{\circ}\text{C}$  | +250 $^{\circ}\text{C}$ | DIN 43760 |
| Lin. R        | 0 $\Omega$              | 10000 $\Omega$          | -         |
| Potentiometer | 10 $\Omega$             | 100 k $\Omega$          | -         |

Cable Resistance per wire: RTD, 50  $\Omega$  max.

Sensor Current: RTD, Nom. 0.2 mA

Sensor Error Detection: RTD, yes

Short Circuit Detection: RTD,  $< 15$   $\Omega$

- 7. STEP RESPONSE TIME:** (0 to 90% or 100 to 10%)

Temperature input:  $\leq 1$  sec

Current/Voltage input:  $\leq 400$  msec

- 8. ACCURACY:** The greater of the general and basic values.

| GENERAL VALUES |                          |                                              |
|----------------|--------------------------|----------------------------------------------|
| Input Type     | Absolute Accuracy        | Temperature Coefficient                      |
| All            | $\leq \pm 0.1\%$ of span | $\leq \pm 0.1\%$ of span/ $^{\circ}\text{C}$ |

| BASIC VALUES                    |                                   |                                                     |
|---------------------------------|-----------------------------------|-----------------------------------------------------|
| Input Type                      | Basic Accuracy                    | Temperature Coefficient                             |
| mA                              | $\leq \pm 4$ $\mu\text{A}$        | $\leq \pm 0.4$ $\mu\text{A}/^{\circ}\text{C}$       |
| Volt                            | $\leq \pm 20$ $\mu\text{V}$       | $\leq \pm 2$ $\mu\text{V}/^{\circ}\text{C}$         |
| Pt100                           | $\leq \pm 0.2$ $^{\circ}\text{C}$ | $\leq \pm 0.01$ $^{\circ}\text{C}/^{\circ}\text{C}$ |
| Lin. R                          | $\leq \pm 0.1$ $\Omega$           | $\leq \pm 0.01$ $\Omega/^{\circ}\text{C}$           |
| Potentiometer                   | $\leq \pm 0.1$ $\Omega$           | $\leq \pm 0.01$ $\Omega/^{\circ}\text{C}$           |
| TC Type:<br>E, J, K, L, N, T, U | $\leq \pm 1$ $^{\circ}\text{C}$   | $\leq \pm 0.5$ $^{\circ}\text{C}/^{\circ}\text{C}$  |
| TC Type: B, R, S,<br>W3, W5, LR | $\leq \pm 2$ $^{\circ}\text{C}$   | $\leq \pm 0.2$ $^{\circ}\text{C}/^{\circ}\text{C}$  |

- 9. CALIBRATION TEMPERATURE:** 20 to 28  $^{\circ}\text{C}$

- 10. RELAY OUTPUTS:** Dual Form A. Contacts rated at 2 A AC or 1 A DC

Hysteresis: 0.1 to 25 % of span or display range

On and off delay: 0 to 3600 sec

Sensor Error Detection: Break / Make / Hold

Max. Voltage: 250 Vrms

Max. Current: 2 A AC or 1 ADC

Max. Power: 500 VA

- 11. ANALOG OUTPUT:**

Current Output:

Signal Range (Span): 0 to 20 mA

Programmable Measurement Range: 0 to 20, 4 to 20, 20 to 0, and 20 to 4 mA

Load Resistance: 800  $\Omega$  max.

Output Compliance: 16 VDC max.

Load Stability: = 0.01 % of span, 100  $\Omega$  load

Sensor Error Detection: 0 / 3.5 mA/ 23 mA / none

Output Limitation:

For 4 to 20 and 20 to 4 mA signals: 3.8 to 20.5 mA

For 0 to 20 and 20 to 0 mA signals: 0 to 20.5 mA

Current Limit:  $\leq 28$  mA

Voltage Output:

Signal Range: 0 to 10 VDC

Programmable Signal Ranges: 0 to 1, 0.2 to 1, 0 to 10, 0 to 5, 1 to 5, 2 to 10, 1 to 0, 1 to 0.2, 5 to 0, 5 to 1, 10 to 0, and 10 to 2 V

Load: 500 K  $\Omega$  min

- 12. ENVIRONMENTAL CONDITIONS:**

Operating Temperature: -20 to +60  $^{\circ}\text{C}$

Operating and Storage Humidity: 95% relative humidity (non-condensing)

- 13. CERTIFICATIONS AND COMPLIANCES:**

### ELECTROMAGNETIC COMPATIBILITY:

**EMC 2004/108/EC Emission and Immunity** EN 61326

EMC Immunity Influence  $\leq \pm 0.5\%$  of span

Extended EMC Immunity: NAMUR NE 21,

A criterion, burst  $\leq \pm 1\%$  of span

### SAFETY

**LVD 2006/95/EC** EN 61010-1

**Factory Mutual Approved**, Report #3034432, FM 3600, 3611, 3810, and ISA 82.02.01

**FM, applicable in:** Class I, Div. 2, Group A, B, C, D

Class I, Div. 2, Group IIC

Zone 2

Max. ambient temperature for T5 60 $^{\circ}\text{C}$

**UL Listed**, File # E324843, UL508, CSA C22.2 No. 14-M95

LISTED by Und. Lab. Inc. to U.S. and Canadian safety standards

- 14. CONSTRUCTION:** IP 50/IP20 Touch Safe, case body is black high impact plastic. Pollution Degree 1.

- 15. CONNECTIONS:** High compression cage-clamp terminal block. Use 60/75 $^{\circ}\text{C}$  copper conductors only.

Wire strip length: 0.3" (7.5 mm)

Wire gage: 26 – 14 AWG stranded wire

Torque: 4.5 inch-lbs (0.5 N-m) max

- 16. WEIGHT:** 5 oz (145 g)

5.6 oz (160 g) with programming module

## PROGRAMMING MODULE

The PGMMOD, Programming/Display Module easily connects to the front of the IAMS and is used to enter or adjust the programming of the IAMS. Insert the top of the programming module first, then allow the bottom to lock into the unit. For applications that require more than one IAMS, the same programming module can be used to program multiple units. In fact, it can store the configuration from one IAMS and download the same configuration to another module. When programming is complete, leave the programming module in place to display the process data or to remove, press the release tab on the bottom of the programming module.

**Display:** LCD display with 4 lines; line 1 is 0.2" (5.5 mm) and displays the input signal, line 2 is 0.13" (3.33 mm) and displays units, line 3 is 0.13" (3.33 mm) and displays analog output or tag number, line 4 shows communication and relay status

**Programming Mode:** Three push buttons combined with a simple and easily understandable menu structure and help text guides you effortlessly through the configuration steps.

**Password Protection:** Programming access may be blocked by assigning a password. The password is saved in the IAMS to guard against unauthorized modifications to the configuration. A default password of "2008" allows access to all configuration menus.



## INSTALLING THE UNIT

The IAMS is designed to mount to a top hat profile DIN rail. The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

## WIRING THE UNIT

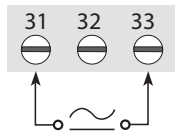
Electrical connections are made via screw-clamp terminals located on the top/bottom of the unit. All conductors should conform to the unit's voltage and current ratings. All cabling should conform to appropriate standards of good installation, local codes, and regulations. It is recommended that power supplied to the unit (DC or AC) be protected by a fuse or circuit breaker.

When wiring the unit, compare the numbers on the terminal blocks against those shown in wiring drawings. Insert the wire under the correct screw-clamp terminal and tighten until the wire is secure. (Pull wire to verify tightness.)



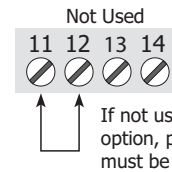
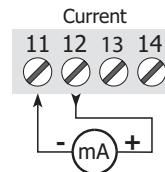
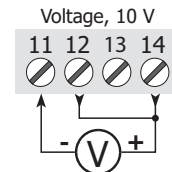
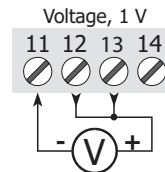
## POWER WIRING

Supply:

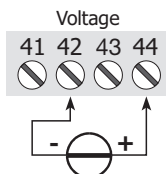
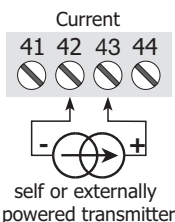
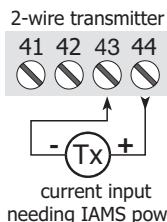
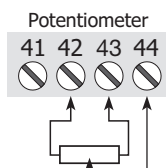
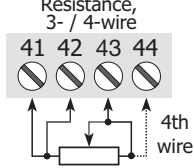
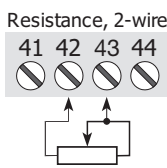
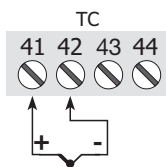
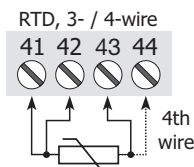
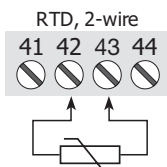


*Note: For DC power connections, there are no polarity concerns.*

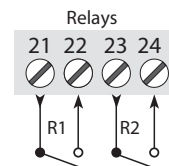
## ANALOG OUTPUT WIRING



## INPUT SIGNAL WIRING



## SETPOINT OUTPUT WIRING



#### **LIMITED WARRANTY**

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

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