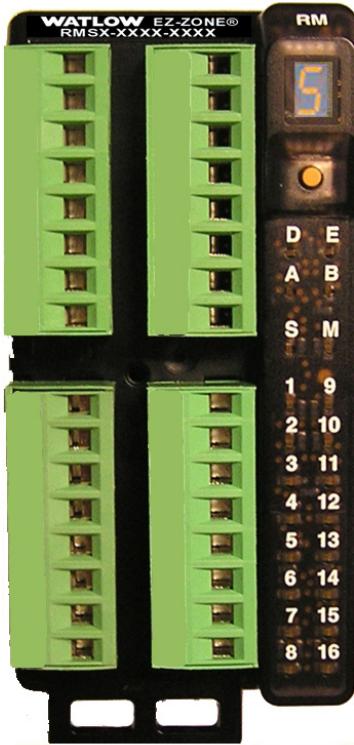


EZ-ZONE® RM Scanner Module

User's Guide



RM Scanner Module



ISO 9001



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Made in the U.S.A.

March 2016

Safety Information

We use note, caution and warning symbols throughout this book to draw your attention to important operational and safety information.

- A "NOTE" marks a short message to alert you to an important detail.
- A "CAUTION" safety alert appears with information that is important for protecting your equipment and performance. Be especially careful to read and follow all cautions that apply to your application.
- A "WARNING" safety alert appears with information that is important for protecting you, others and equipment from damage. Pay very close attention to all warnings that apply to your application.
- The safety alert symbol,  (an exclamation point in a triangle) precedes a general CAUTION or WARNING statement.
- The electrical hazard symbol,  (a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING safety statement. Further explanations follow:

Symbol	Explanation
	CAUTION - Warning or Hazard that needs further explanation than label on unit can provide. Consult User's Guide for further information.
	ESD Sensitive product, use proper grounding and handling techniques when installing or servicing product.
	Unit protected by double/reinforced insulation for shock hazard prevention.
	Do not throw in trash, use proper recycling techniques or consult manufacturer for proper disposal.
	Enclosure made of Polycarbonate material. Use proper recycling techniques or consult manufacturer for proper disposal.
	Unit can be powered with either alternating current (ac) voltage or direct current (dc) voltage.
	Unit is a Listed device per Underwriters Laboratories®. It has been evaluated to United States and Canadian requirements for Process Control Equipment. UL 61010 and CSA C22.2 No. 61010. File E185611 QUYX, QUYX7. See: www.ul.com
	Unit is a Listed device per Underwriters Laboratories®. It has been evaluated to United States and Canadian requirements for Hazardous Locations Class 1 Division II Groups A, B, C and D. ANSI/ISA 12.12.01-2007. File E184390 QUZW, QUZW7. See: www.ul.com

	Unit is compliant with European Union directives. See Declaration of Conformity for further details on Directives and Standards used for Compliance.
	Unit has been reviewed and approved by CSA International for use as Temperature Indicating-Regulating Equipment per CSA C22.2 No. 24. See: www.csa-international.org

Warranty

The EZ-ZONE® RM Scanner module is manufactured by ISO 9001-registered processes and is backed by a three-year warranty to the first purchaser for use, providing that the units have not been misapplied. Since Watlow has no control over their use, and sometimes misuse, we cannot guarantee against failure. Watlows' obligations hereunder, at Watlows' option, are limited to replacement, repair or refund of purchase price, and parts which upon examination prove to be defective within the warranty period specified. This warranty does not apply to damage resulting from transportation, alteration, misuse or abuse. The purchaser must use Watlow parts to maintain all listed ratings.

Technical Assistance

If you encounter a problem with your Watlow controller, review your configuration information to verify that your selections are consistent with your application: inputs, outputs, alarms, limits, etc. If the problem persists, you can get technical assistance from your local Watlow representative (see back cover), by e-mailing your questions to wintechsupport@watlow.com or by dialing +1 (507) 494-5656 between 7 a.m. and 5 p.m., Central Standard Time (CST). Ask for an Applications Engineer. Please have the following information available when calling:

- Complete model number
- All configuration information
- User's Guide
- Factory Page

Return Material Authorization (RMA)

1. Call Watlow Customer Service, (507) 454-5300, for a Return Material Authorization (RMA) number before returning any item for repair. If you do not know why the product failed, contact an Application Engineer or Product Manager. All RMA's require:
 - Ship-to address
 - Bill-to address
 - Contact name
 - Phone number
 - Method of return shipment
 - Your P.O. number
 - Detailed description of the problem
 - Any special instructions
 - Name and phone number of person returning the product.

2. Prior approval and an Return Merchandise Authorization number from the Customer Service Department is required when returning any product for credit, repair or evaluation. Make sure the Return Merchandise Authorization number is on the outside of the carton and on all paperwork returned. Ship on a Freight Prepaid basis.
3. After we receive your return, we will examine it and try to verify the reason for returning it.
4. In cases of manufacturing defect, we will enter a repair order, replacement order or issue credit for material returned. In cases of customer misuse, we will provide repair costs and request a purchase order to proceed with the repair work.
5. To return products that are not defective, goods must be in new condition, in the original boxes and they must be returned within 120 days of receipt. A 20 percent restocking charge is applied for all returned stock controls and accessories.
6. If the unit cannot be repaired, you will receive a letter of explanation and be given the option to have the unit returned to you at your expense or to have us scrap the unit.
7. Watlow reserves the right to charge for no trouble found (NTF) returns.

This EZ-ZONE® RM Scanner User's Guide is copyrighted by Watlow Electric, Inc., © March 2016 with all rights reserved.

EZ-ZONE RM is covered by U.S. Patent No. 6,005,577 and Patents Pending

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1

Chapter 1: Overview

Available EZ-ZONE RM System Literature and Resources

Document Title and Part Number	Description
EZ-ZONE Rail Mount Access (RMA) User's Guide, part number: 0600-0072-0000	Describes how to connect the RM system into an industrial network, how to use data logging, module backup and the real-time clock.
EZ-ZONE Rail Mount Controller (RMC) User's Guide, part number: 0600-0070-0000	The RMC module is an advanced integrated controller capable of PID and limit control. This document describes how to configure and program all loops of control and communications.
EZ-ZONE Rail Mount High Density (RMH) User's Guide, part number: 0600-0074-0000	This module extends the density of the standard RM modules (number of control loops and I/O points). The User Guide describes common usage, communications and the number I/O points available.
EZ-ZONE Rail Mount Expansion (RME) User's Guide, part number: 0600-0073-0000	When additional I/O is needed the Expansion module fills the gap. This document describes common usage and the various types of I/O available.
EZ-ZONE Rail Mount Limit (RML) User's Guide, part number: 0600-0075-0000	The RML module will protect against unwanted thermal runaway and over temperature conditions. The User Guide describes configuration, programming and communications capabilities.
EZ-ZONE Remote User Interface (RUI) User's Guide, part number: 0600-0060-0000	The RUI provides a visual LED display to the RM configuration and setup menus. This document illustrates and describes connections and also describes the Home Page for each RM module as viewed from the RUI.
EZ-ZONE RM Specification Sheet, part number: WIN-EZRM-0414	Describes RM hardware options, features, benefits and technical specifications.
Watlow Support Tools DVD, part number: 0601-0001-0000	Contains all related user documents, tutorial videos, application notes, utility tools, etc...

The DVD described above ships with the product and as stated contains all of the literature above as well as much more. If the DVD is not available one can be acquired by contacting Watlow Customer Service at 1-507-454-5300.

As an alternative to the DVD, all of the user documentation described above can also be found on the Watlow website. Click on the following link to find your document of choice: <http://www.watlow.com/literature/index.cfm>. Once there, simply type in the desired part number (or name) into the search box and download free copies.

Your Comments are Appreciated

In an effort to continually improve our technical literature and ensure that we are providing information that is useful to you, we would very much appreciate your comments and suggestions. Please send any comments you may have to the following e-mail address: TechlitComments@watlow.com

Introduction

The EZ-ZONE® RM Scanner (RMS) is capable of monitoring from 1 to 16 inputs. As is the case with all of the RM family modules the RMS can be used as a standalone device or it can be used as part of a larger system of interconnected RM modules. The RMS takes the pain out of solving your need for high density monitoring requirements as either a stand-alone module or in applications that require distributed control.

It just got a whole lot easier to solve the thermal requirements of your system. The RMS module is provided in a space-saving, rail-mount package and is highly scalable where you only pay for what you need. For those applications that require the ability to configure/monitor the control over a network, Modbus RTU communications is an option. Other communications protocols are also available (e.g., EtherNet/IP, DeviceNet, Modbus TCP and Profibus DP) when used in conjunction with an RM Access (RMA) module or when using a Remote User Interface/Gateway (RUI/GTW).

Standard Features and Benefits

Communication Capabilities

- Supports network connectivity to a PC or PLC
- Watlow Standard Bus or Modbus® RTU
- Provides plug and play capabilities with Remote User Interface (RUI's) and RMA module
- Free standard bus communications port and free PC software (EZ-ZONE Configurator and Composer)

Additional Control Integration Options

- Includes programmable timer functions
- Includes programmable counter functions
- Allows for simple math and logic programming options

Integrated Thermal Loop Diagnostics

- Users can easily tell that the entire thermal system is functioning properly
- Provides complete system diagnostics that are far superior to simple discrete level diagnostics
- Allows for flexible synergistic use of hardware, such as using one loop's sensor as a backup to another loop in the event of sensor failure.
- Helps prevent load loss or allow for maintenance to be scheduled when more convenient.
- Provides notification of system problems to help reduce maintenance and service costs

Off-the-Shelf Designed System Solution

- Improves system reliability with a factory integrated solution that minimizes inter-module connections and potential problems at screw termination points.
- Reduces installation cost
- Eliminates compatibility headaches often encountered with using many different components and brands

Scanner Handles High Ambient Temperatures

- Operates in an unprecedented temperature range of -18 to 65°C (0 to 149°F) for cabinets and panel enclosures with elevated temperature levels

Memory for Saving and Restoring User-Defined Parameter Default Settings

- Allows customers to save and restore their own defined defaults for machine parameter settings
- Reduces service calls and downtime due to inadvertent end user parameter adjustments

Synergistic Module Control (SMC)

- Allows outputs selected for control (heat/cool), alarms or events to be located in any physical module, regardless of which module is connected to the input sensor

Split-Rail Control (SRC)

- Allows modules to be mounted together or mounted remotely from one another (maximum distance 200 feet or 61 meters)
- Shares control operation via Synergistic Module Control (SMC) capability
- Allows individual modules to be mounted closer to the physical input and output devices to which they are wired
- Improves system reliability and lowers wiring costs

Agency Approvals: UL® listed, CE, RoHS, W.E.E.E. FM, SEMI F47-0200, Class 1 Div. 2 Rating on Selected Models

- Assures prompt product acceptance
- Reduces panel builder's documentation and agency costs

Removable Connectors

- Assures reliable wiring and reduces service calls
- Simplifies installation

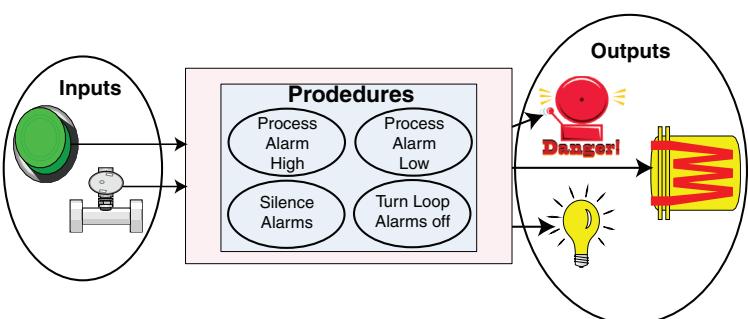
Three-Year Warranty

- Demonstrates Watlow's reliability and product support

A Conceptual View of the RMS Module

The flexibility of the RMS software and hardware allows for variation in configurations. Acquiring a better understanding of its functionality and capabilities while at the same time planning out how the controller can be used will deliver maximum effectiveness in your application.

It is useful to think of the scanner in three parts: inputs, procedures and outputs. Information flows from an input to a procedure to an output when the scanner is properly configured. An RMS module can carry out several procedures at the same time, e.g., monitoring inputs for several different alarm situations, monitoring and acting upon digital inputs, and outputs can be configured to drive devices such as heaters, audible alarms, lights. Each process needs to be thought out carefully and the scanner's inputs, procedures and outputs set up properly.



Functions

Functions use input signals to calculate a value. A function may be as simple as reading a digital input to set a state to true or false, or reading a temperature to set an alarm state to on or off. Alternatively, if a failure with the primary sensing device should occur, sensor backup could be utilized to avoid an unwanted shutdown.

To set up a function, one of the first things that must be considered is the function source and instance. For example, if the control is equipped with Digital Inputs (source) and it was decided to use DI 9 (instance) it can then be associated with an Action to reset an individual alarm or all alarms.

To configure a Digital Input as described above:

1. Navigate to the Setup Page and then to the Digital I/O menu.
2. Select the desired instance and set the direction to input voltage or input dry contact.
3. Navigate to the Setup Page and then the Action menu.
4. Set the Action Function to Alarm
5. Select which alarm instance will be reset (0 equals all)
6. Select the Source Function to Digital I/O
7. Select the Source Instance (step 2 above)
8. Select the Source Zone (0 equals the module being configured).
9. Select the Transmitter Active Level to execute the desired function.

This configuration is now complete. When the selected digital input is active, the alarm or all alarms that are latched without a currently existing alarm condition will be reset. If a specific alarm instance (1 - 16) is selected (step 5) it will be that instance alone that will be reset.

Note:

Alarms will reset automatically when the condition that caused the alarm goes back to a non-alarm state if the Latching prompt is set to non-latching (Setup Page, Alarm Menu).

Keep in mind that a function is a user-programmed internal process that does not execute any action outside of the controller. To have any affect outside of the controller, an output must be configured to respond to a function.

Inputs

The inputs provide the information that any given programmed procedure can act upon. Simply stated, this information may come from an operator pushing a button or from a sensor monitoring the temperature of a part being heated or cooled.

Each analog input typically uses a thermocouple, RTD or thermistor to read the process temperature. It can also read volts, current or resistance, allowing it to use various devices to read humidity, air pressure, operator inputs and others values. Each analog input must be configured to match the device connected to that input (see: Analog Input Menu, Setup Page).

Each digital input reads whether a device is active or inactive. An RMS module equipped with digital input/output hardware includes two sets of terminals where each of which can be used as either an input or an output. Each pair of terminals must be configured to function as either an input or an output with the direction parameter (see: Digital Input/Output Menu, Setup Page).

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Outputs

Outputs can perform various functions or actions in response to information provided by a function, such as removal of the control voltage to a contactor; driving a heater; turning a light on or off; unlocking a door; or turning on an audible alarm.

Assign an output to a function in the Output Menu or Digital Input/Output Menu. Then select which instance of that function will drive the selected output. For example, in using an RMS module, an output can be configured to respond to the output of the PID algorithm from another RM module to drive a heater.

You can assign more than one output to respond to a single instance of a function. For example, alarm 2 could be used to trigger a light connected to output 1 and a siren connected to digital output 5.

Actions

Based on a given input (Digital I/O, Event output, Logic function, etc..) the Action function can cause other functions to occur. To name a few, set alarms to off, silencing alarms and restoring user memory.

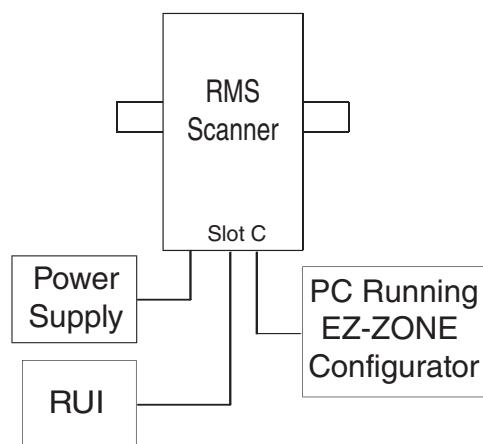
A Conceptual View of RM Hardware Configurations

Due to the scalability and flexibility in the RM system a user has several options available in the way that the hardware can be connected. Listed below are a few examples.

RMS Connected to a Remote User Interface (RUI) and a Personal Computer (PC)

In this configuration the RUI and PC are connected to the RMS module via Watlow's Standard Bus where both will be able to talk directly to the RMS module.

In the graphic to the right, the PC running EZ-ZONE Configurator software and or the RUI can be used to configure and then monitor the RMS and other modules connected to it



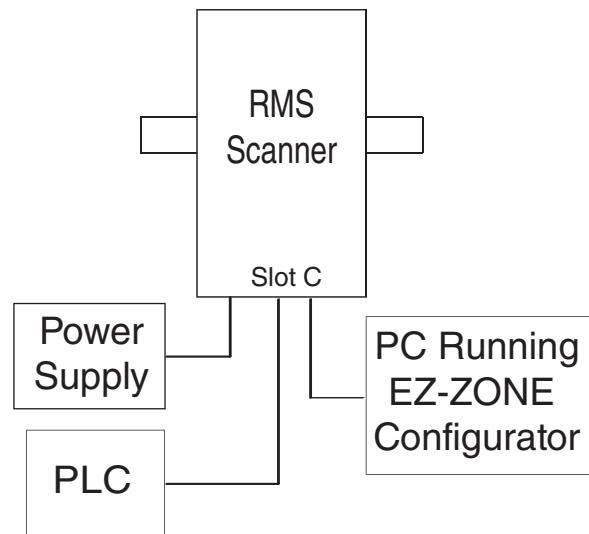
RMS Module Connected to a Programmable Logic Controller (PLC) on a DIN Rail

In the illustration shown below, the PLC and the RMS module must be equipped with Modbus RTU.

Note:

If it is intended to use an RUI or a PC using EZ-ZONE Configurator software it will be necessary to switch the protocol on the RMS to Watlow's Standard Bus to successfully communicate; follow the steps below to switch the RMS to the Standard bus protocol.

1. Disconnect all Modbus devices from the network
2. Push and hold the orange button on the face of the module for approximately 6 seconds
3. When the LED display (above the orange button) changes to , momentarily release the orange button and then push it again where  will appear (symbol for Standard Bus), release the orange button
4. Push the orange button again for approximately 3 seconds (LED display will become brighter) to change the Standard Bus address if needed

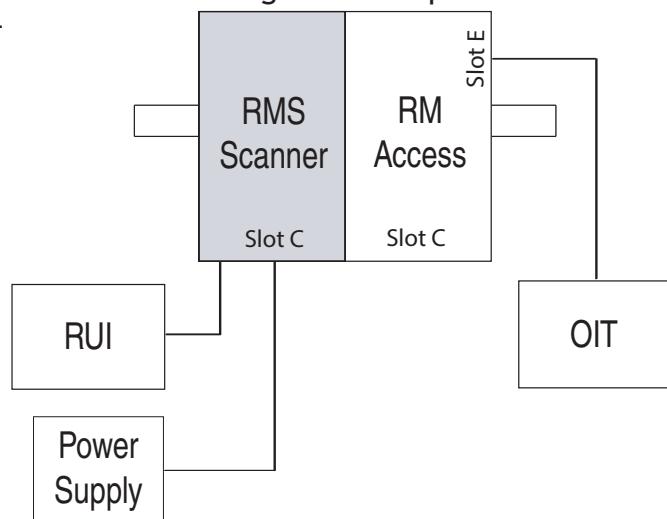


RMS Module Connected to an Operator Interface Terminal (OIT) through an RMA

In this configuration the RMS can be connected to the OIT through the RMA running any of a number of available protocols. The RMA and the OIT must be using the same protocol while the communications from RMA to the RMS module is accomplished over the backplane using Watlow's Standard Bus protocol. Available protocols in the RMA follow:

1. EtherNet/IP and or Modbus TCP
2. DeviceNet
3. Modbus RTU
4. Profibus DP

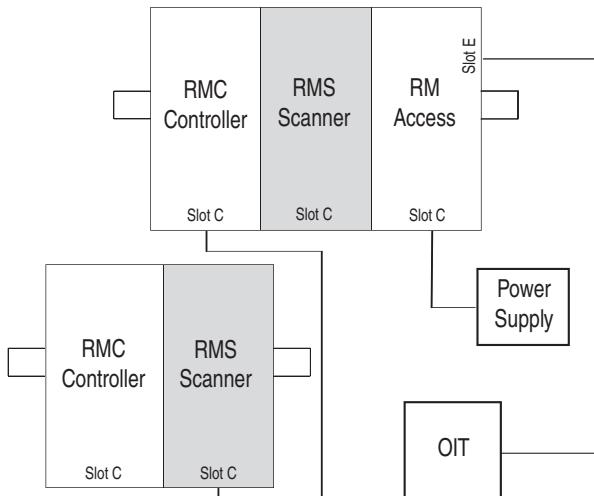
Notice that in the example to the right that there is an *optional* RUI connected to the RMS module. An OIT is not generally used to configure a control but is used more for run-time information. As an alternative for configuration the RUI could be used to configure and monitor in a remote location.



If using Modbus, one advantage in using an RMA module while also having an RUI and a PC connected is that the RMS could be set for Standard Bus all of the time while the RMA can simultaneously run Modbus and Standard Bus protocols, no protocol switching required.

RMS Connected to a Split Rail with OIT

In this configuration both the inter-module bus (backplane communications) and Standard Bus are connected between rails to allow for remote capabilities. It is recommended that the split rail connection not exceed 100 feet. In this configuration the OIT can communicate with all modules (maximum 16 modules any combination with one Access module).



Module Orientation

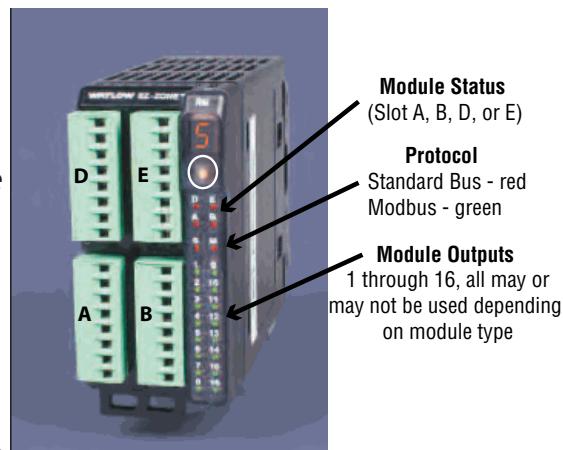
The picture below represents one of six possible RM modules. All six will have four slots on the face (slot A, B, D, and E) and one on the bottom (slot C) not shown. All of these slots are not always used on all modules.

Note:

For correct operation and accuracy, the module must be mounted in a vertical orientation as shown.

On the face of the module there is a button (white circle) under the Zone address (**S**) that when pushed and held has the following functions:

1. For any module, push and hold the orange button for approximately 2 seconds. The address will intensify indicating that it can now be changed. Release and repeatedly press to change to the desired unique address.
2. For the scanner module, if equipped with the Modbus protocol (RMSxxxxxxxxxx1xx), pushing and holding the orange button for approximately 6 seconds will cause the module to display **P** for protocol. Releasing the button and then pushing it again (within 6 seconds), the display will toggle between **M** (Modbus) and **S** (Standard Bus). Valid addresses for Modbus and Standard bus range from 1 - 16 (**I** - **9**, **R** is 10, **B** is 11, **C** is 12, **d** is 13, **E** is 14, **F** is 15, and **h** is 16). The Access module is shipped at address **J** or 17.



Getting Started Quickly

Consider taking the following steps to quickly commission your control:

- Wire and connect the power source to the control
- Wire and connect input and output devices to the control
- Power up the control and navigate to the Setup Page to configure inputs, outputs, adjust set points, alarms, etc...

The RMS controller has a page and menu structure that is listed below along with a brief description of its purpose. The menu structure can be easily seen and navigated using [EZ-ZONE Configurator software](#) or the Remote User Interface (RUI).

Note:

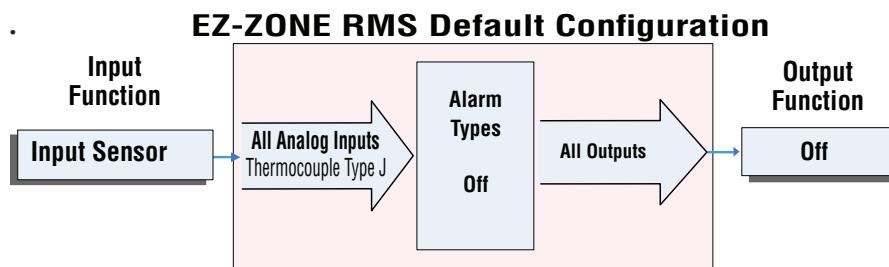
The menu navigation as described below applies when the RMS is connected to the RUI which is optional equipment.

Setup Page Using the RUI, push and hold the up and down keys (Δ ∇) for 6 seconds to enter. (See the Setup Page for further information)	A user would want to setup their control prior to operation. As an example, define the input type, alarm sides (high and or low) or set the output function.
Operations Page Using the RUI push and hold the up and down keys (Δ ∇) for 3 seconds to enter. (See the Operations Page for further information)	After setting up the control to reflect your equipment, the Operations Page would be used to monitor or change runtime settings. As an example, the user may want to see the current status (on or off) of an event in the Action Menu.
Factory Page Using the RUI push and hold the Infinity and the green Advance keys (∞ \circlearrowright) for 6 seconds to enter. (See the Factory Page for further information)	For the most part the Factory Page has no bearing on the control when running. A user may want to enable password protection, view the control part number or perhaps create a custom Home Page.
Home Page When using the RUI, the control is at the Home Page when initially powered up where it will display the value of Analog Input 1 in the upper display and the value of Analog Input 2 in the lower display. Note: The Home Page is visible only when using the RUI.	Pushing the green Advance Key \circlearrowright will cause the display to show the value of Analog Input 1 in the upper display and Analog Input 2 in the lower display. With each successive push of the green advance key the display will sequentially show the value of all remaining analog inputs in the upper display and the lower display will show the corresponding LED display. (e.g., $R \text{ in } 3$ for input 3)

The default RMS loop configuration out of the box is shown below:

- All Analog Input functions are set to thermocouple, type J (to change go to the Setup Page, Analog Input Menu)
- All Process Value functions are set to off (to change go to the Setup Page, Process Value Menu)
- All outputs are set to off (to change go to the Setup Page, Output Menu)

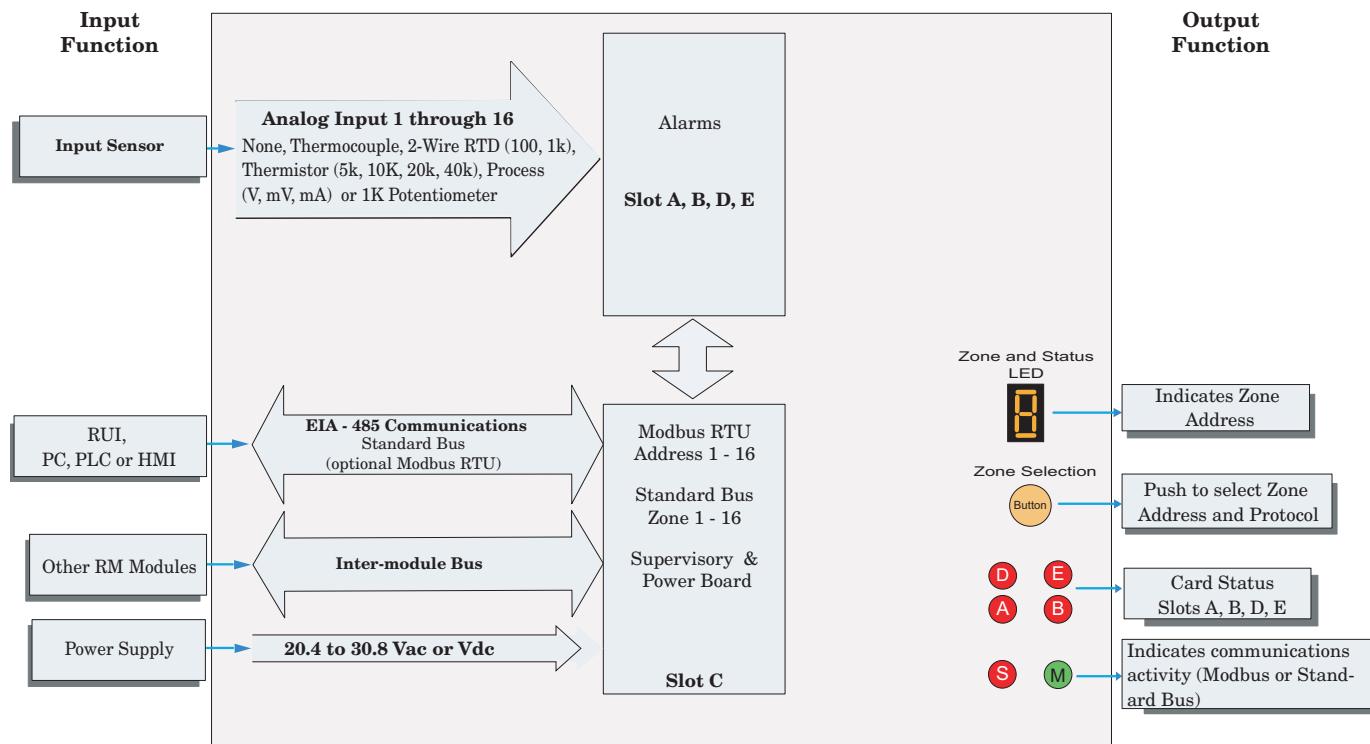
Once the scanner has been wired and setup, power up the control. If using an RUI the upper display will show the value of Analog Input 1 and the lower display will show the value of Analog Input 2



EZ-ZONE RMS Module - System Diagram

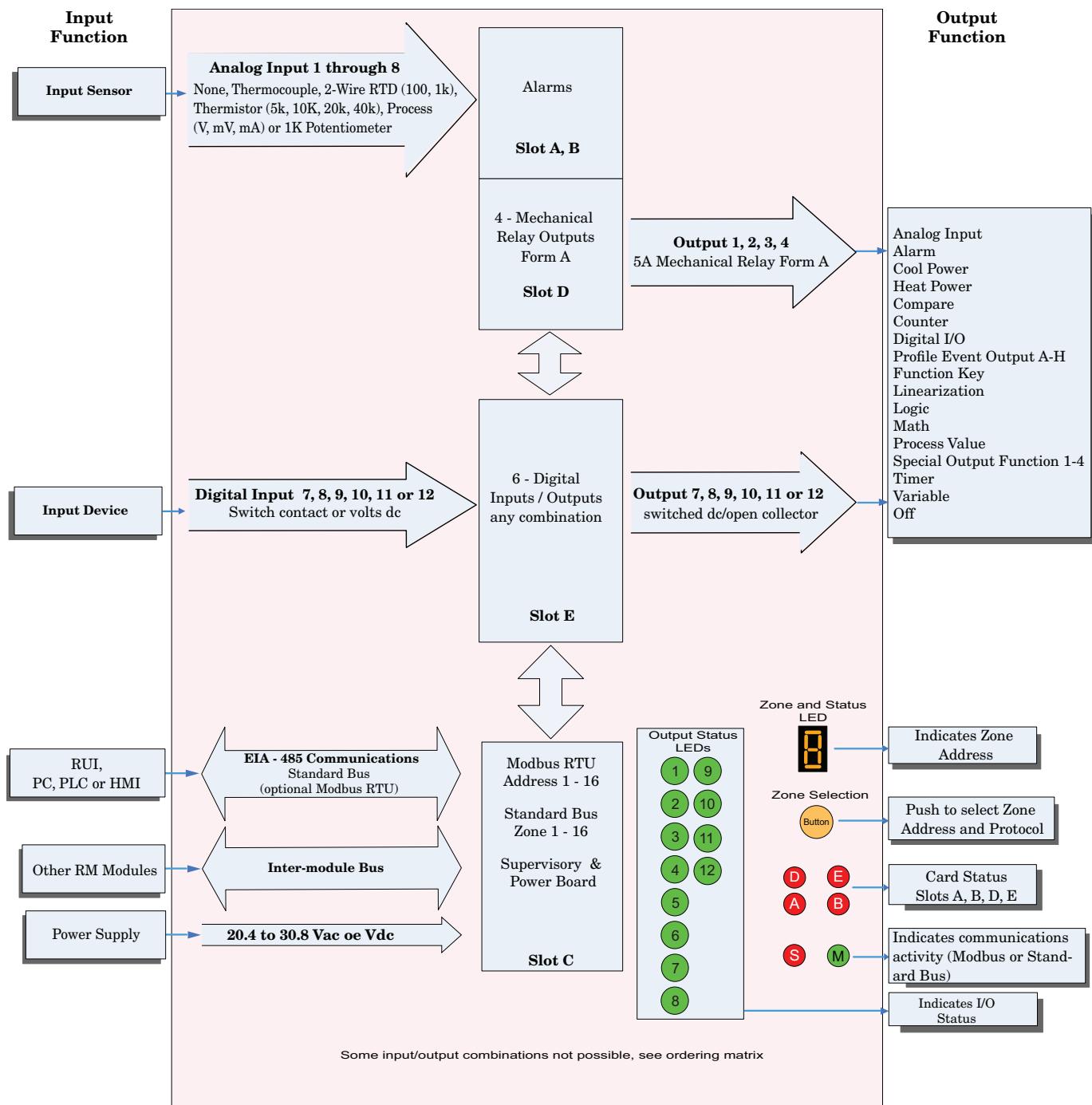
16 Scanner Channels - Slots A, B, D and E

R M S x - [R,P] [R,P] [R,P] [R,P] - A A A A



EZ-ZONE RMS Module - System Diagram

8 Scanner Channels - Slots A, B
 4 - Form A Mechanical Relays - Slot D
 6 - Digital I/O - Slot E
R M S x - [R,P] [R,P] J C - A A A A



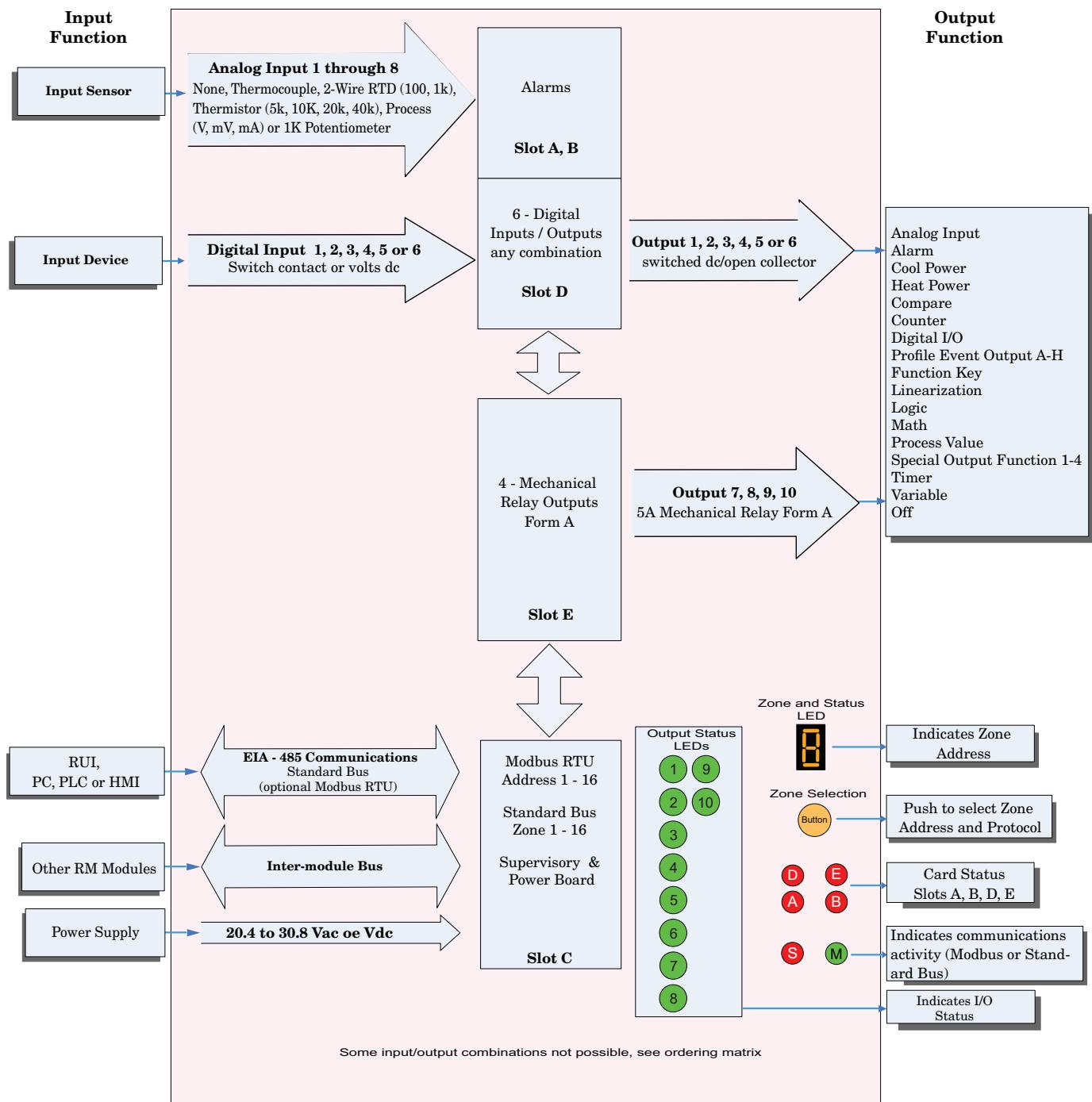
EZ-ZONE RMS Module - System Diagram

8 Scanner Channels - Slots A, B

6 - Digital I/O - Slot D

4 - Form A Mechanical Relays - Slot E

R M S x - [1,2] [1,2] C J - A A A A



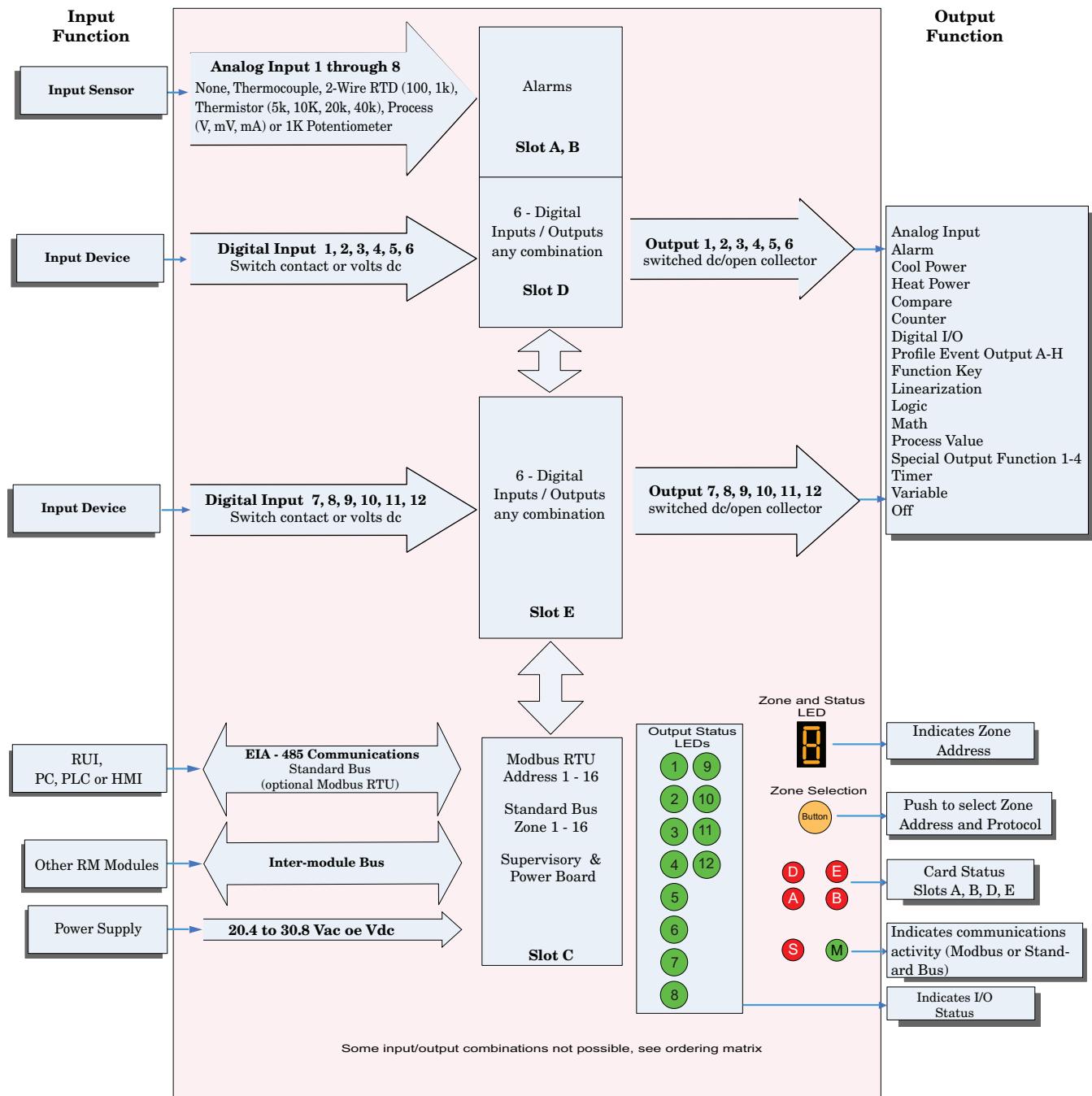
EZ-ZONE RMS Module - System Diagram

8 Scanner Channels - Slots A, B

6 - Digital I/O - Slot D

6 - Digital I/O - Slot E

R M S x - [1,2] [1,2] C C - A A A A



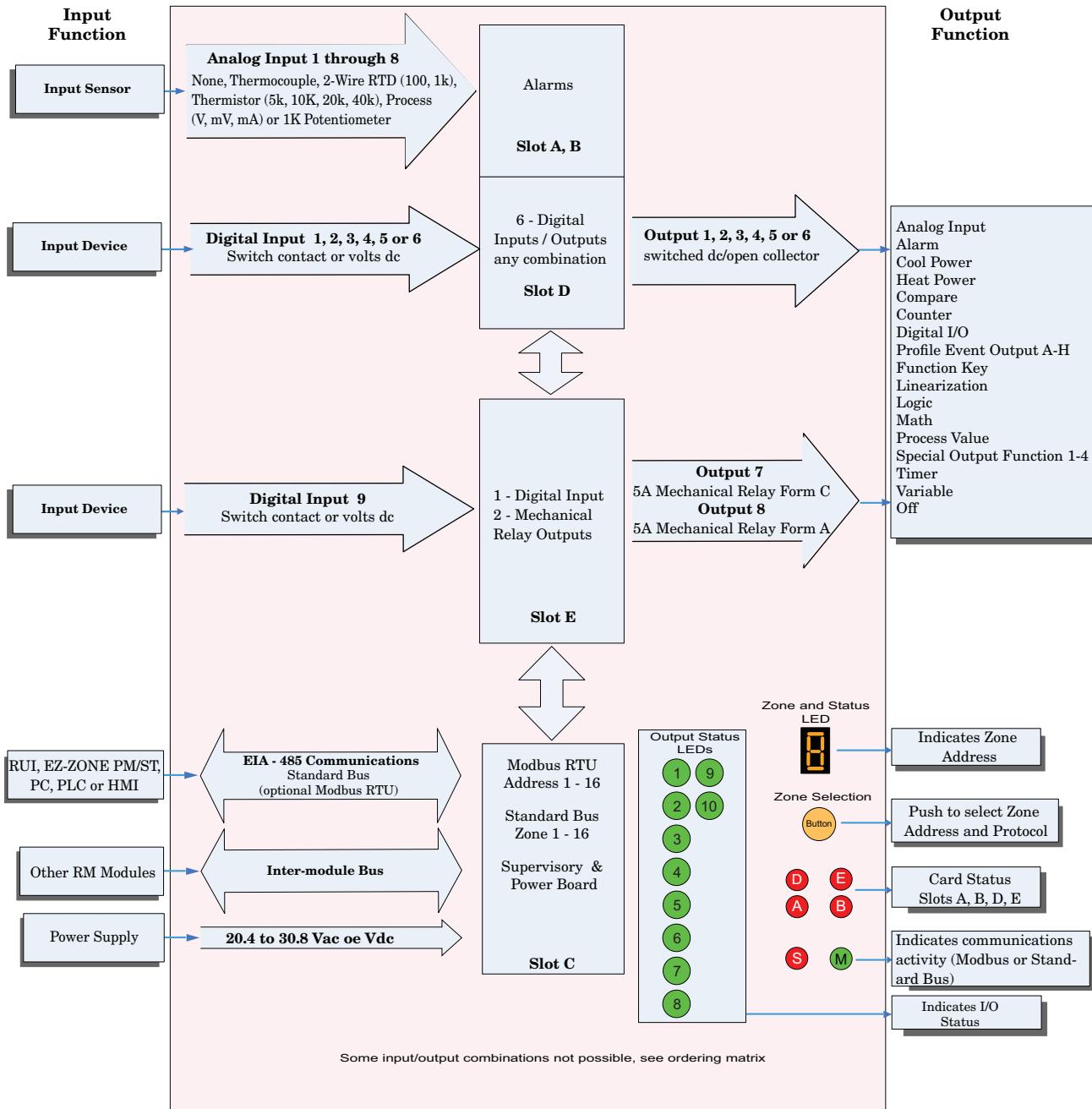
EZ-ZONE RMS Module - System Diagram

8 Scanner Channels - Slots A, B

6 - Digital I/O - Slot D

1 - Digital Input/2 Mechanical Relays - Slot E

R M S x - [1,2] [1,2] C B - A A A A



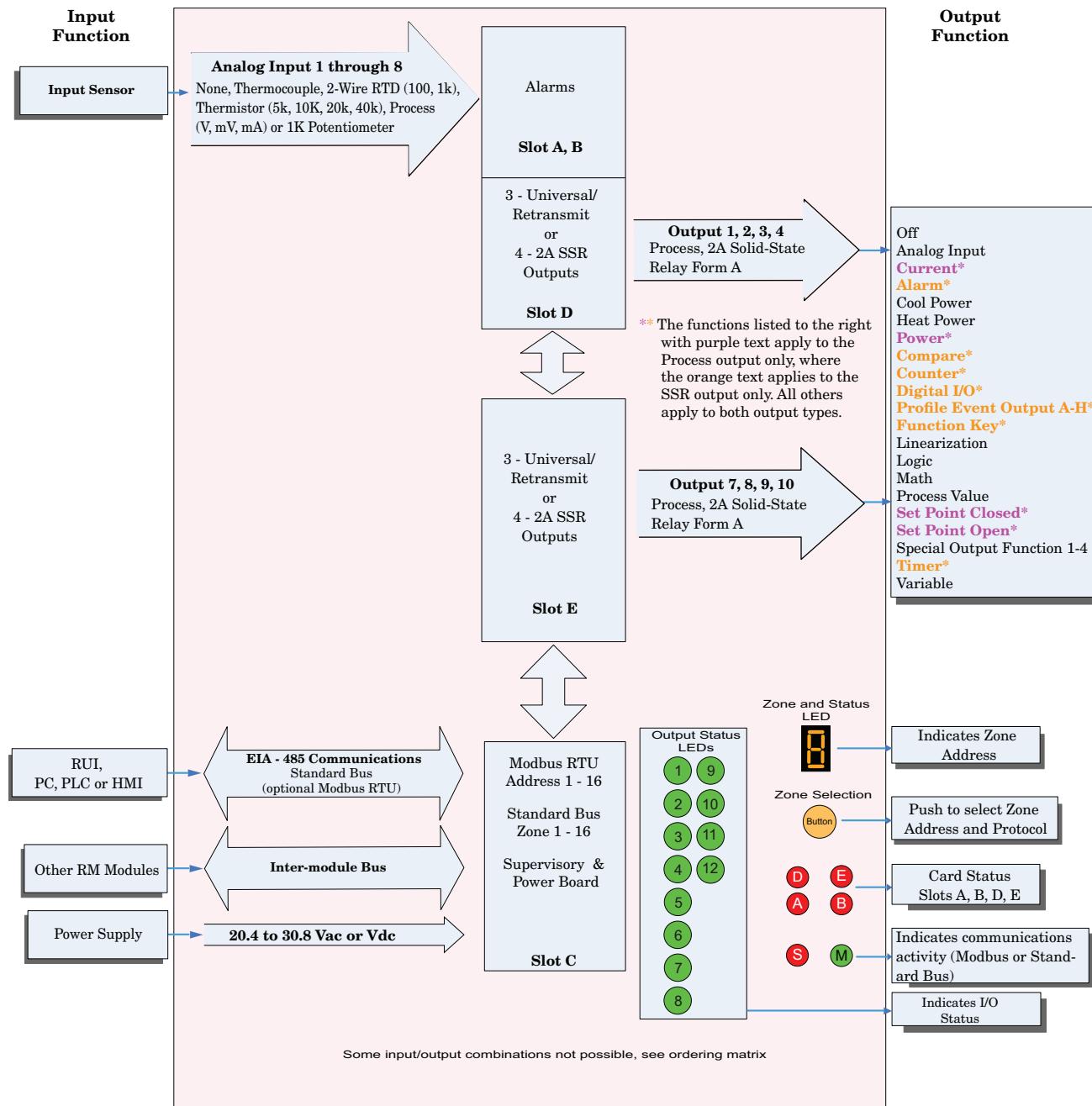
EZ-ZONE RMS Module - System Diagram

8 Scanner Channels - Slots A, B

3 - Process Outputs - Slot D or E

4 - SSR Outputs - Slot D or E

R M S x - [R, P] [R, P] [F,L] [F,L] - A A A A



2

Chapter 2: Install and Wire

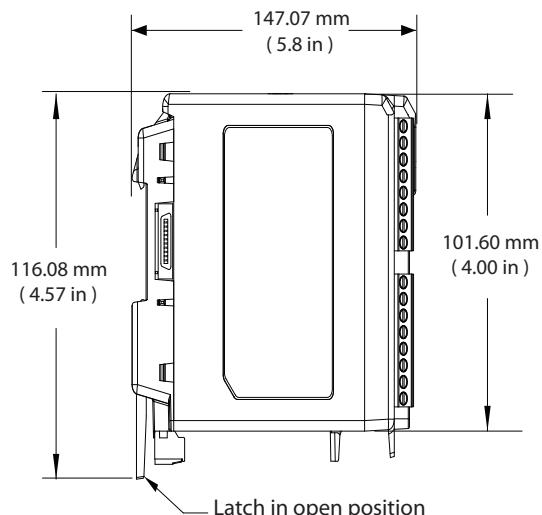
Dimensions

As can be seen below the dimensions of the RMS module will change slightly based on the type of connector used.

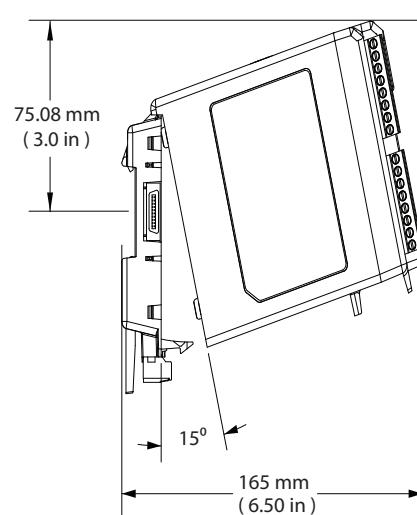
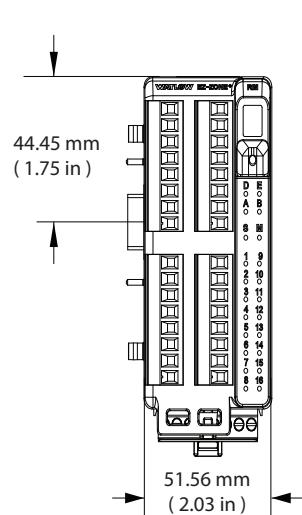
Note:

Modules should always be mounted vertically. For easy removal and placement of modules it is recommended that there be a 76.2 mm (3.00 in) clearance on the top, bottom and front of each module.

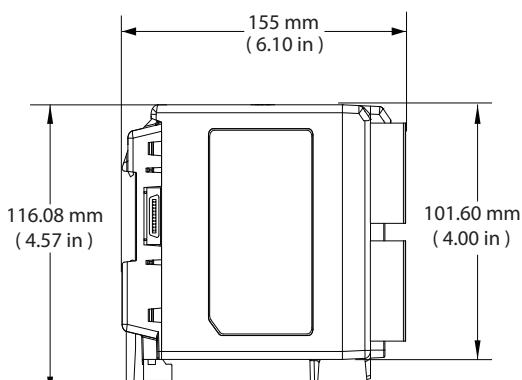
Module Removal Clearance



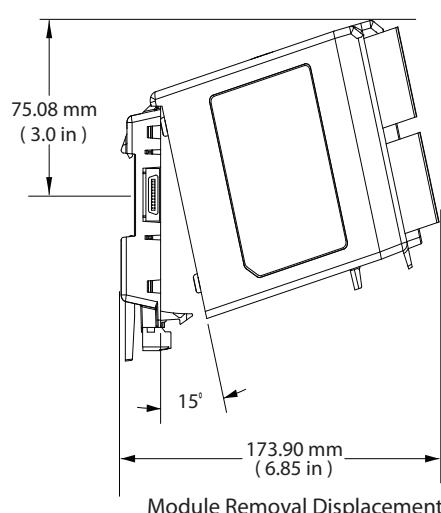
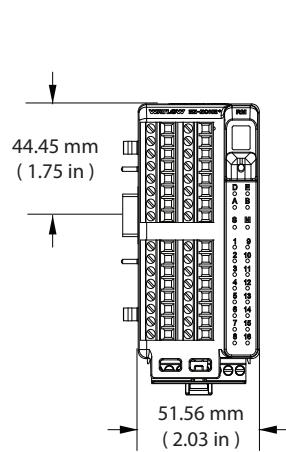
Standard Connectors



Module Removal Clearance

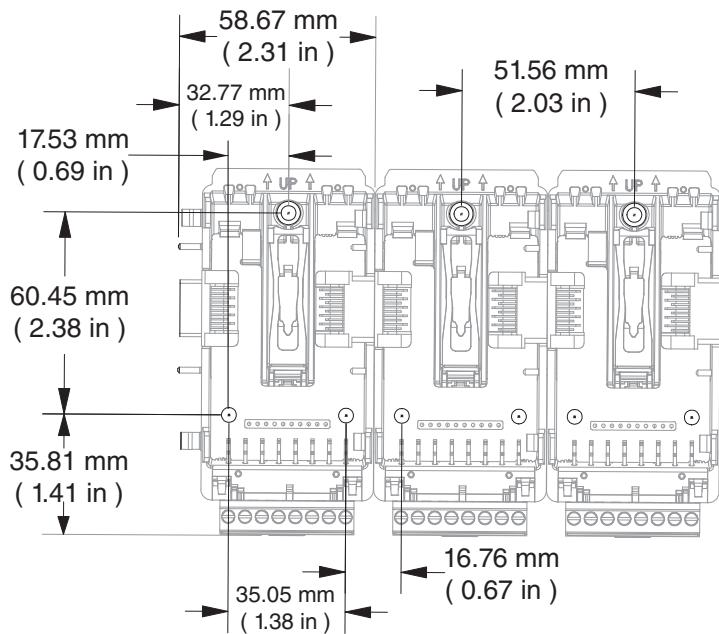


Straight Connectors



Dimensions (cont.)

Chassis Mount Front View (Module Removed) - Screw Connection Pattern



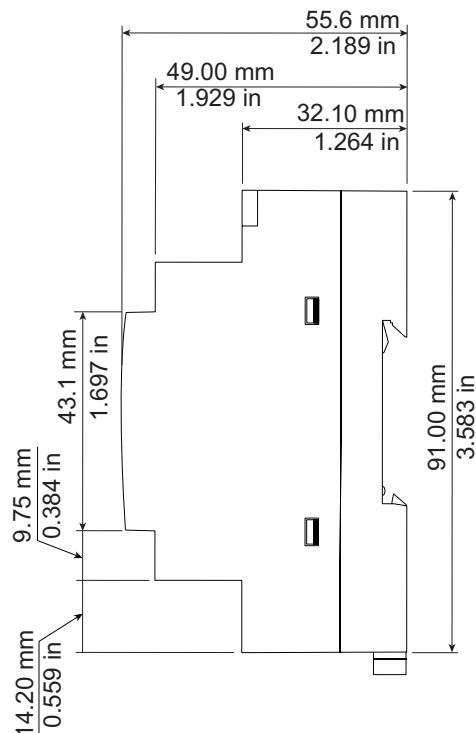
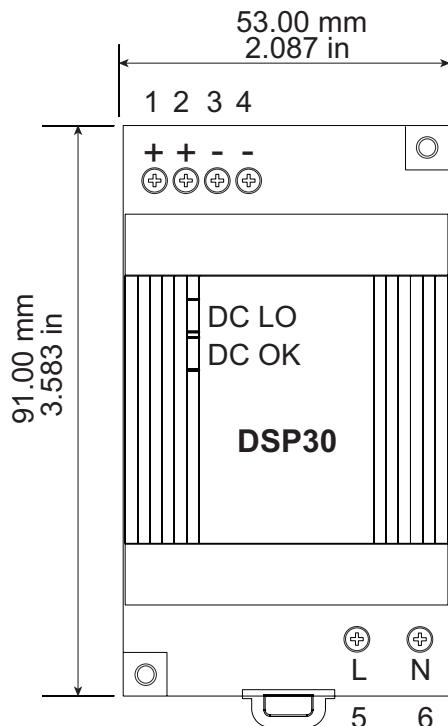
The view above is representative of the modular backplane without the module.

Recommended chassis mount hardware:

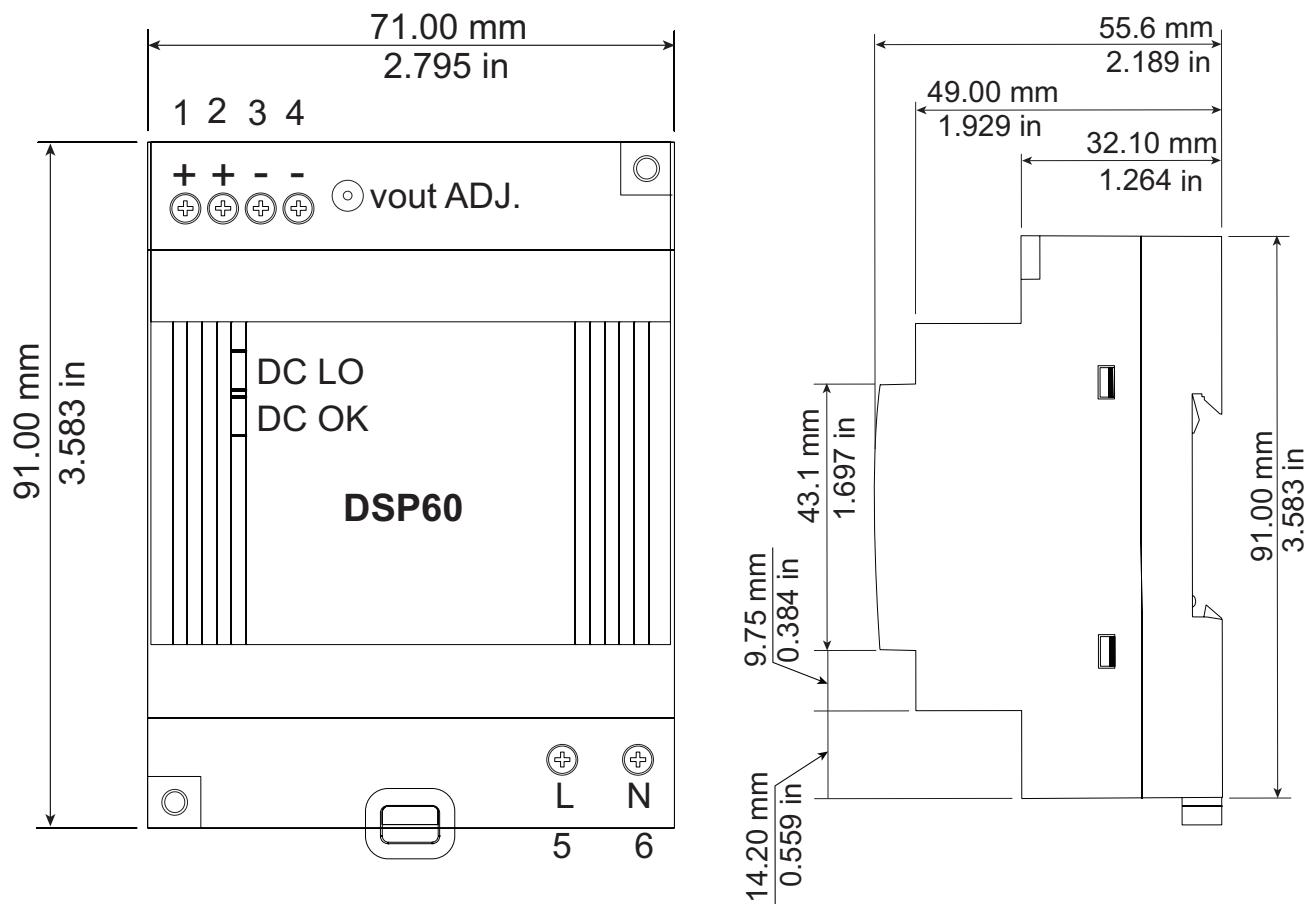
1. #8 screw, 3/4" long
2. Torque to 10 -15 in-lb
3. No washers of any kind

Power Supplies

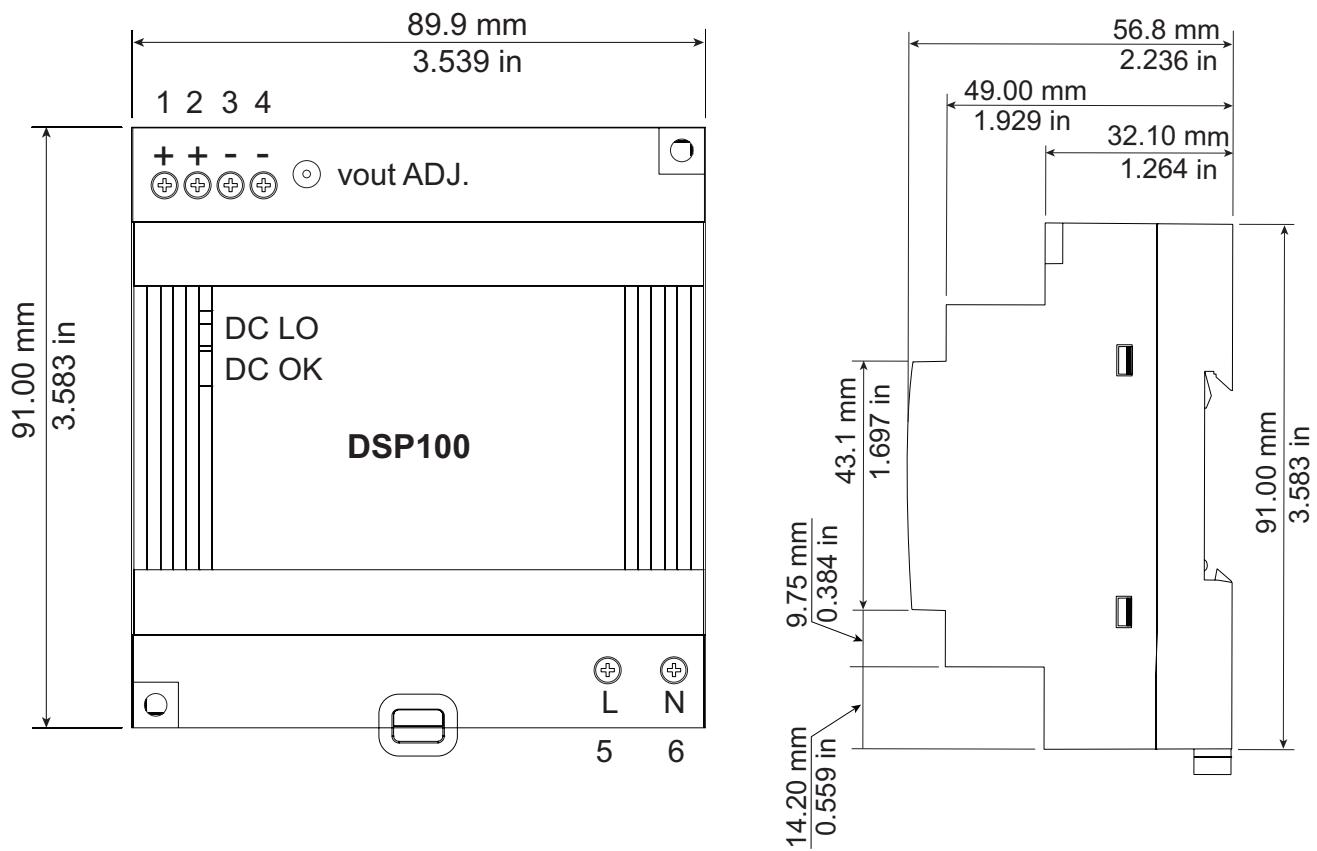
DSP 30



DSP 60



DSP 100



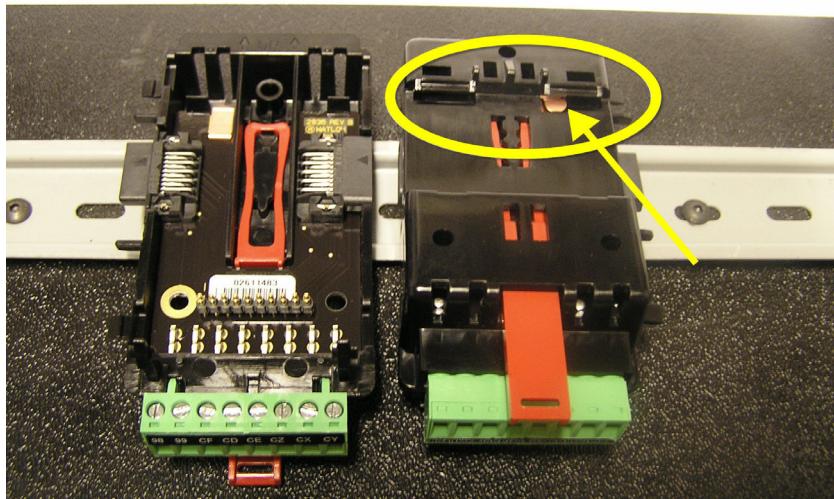
Power Supply Specifications				
		DSP 30	DSP60	DSP100
AC Input Voltage Range	VAC	90 - 264VAC, Class II double insulated (No ground connection required)		
Input Frequency	Hz	47 - 63Hz		
DC Input Voltage range	VDC	120 - 370VDC		
Inrush Current (115 / 230VAC)	A	25 / 50A	30 / 60A	30 / 60A
Output Voltage Accuracy	%	$\pm 1\%$ of Nominal		
Over voltage Protection	V	120 - 145%		
LED Indicators	- - - -	Green LED = On, Red LED = DC Output Low		
Operating Temperature	- - - -	-25 to +71 °C (Derate linearly 2.5%/ $^{\circ}\text{C}$ from 55 to 71 °C)		
Storage Temperature	- - - -	-25 to +85 °C		
Operating Humidity	- - - -	20 - 95% RH (non condensing)		
Vibration (Operating)	- - - -	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)		
Safety Agency Approvals		UL1310 Class 2(1), UL508 Listed, UL60950-1, EN60950-1, CE		

For a comprehensive listing of these specifications point your browser to : <http://us.tdk-lambda.com/lp/products/dsp-series.htm>

RMS Installation and Removal on a DIN Rail

Modular Backplane Connector

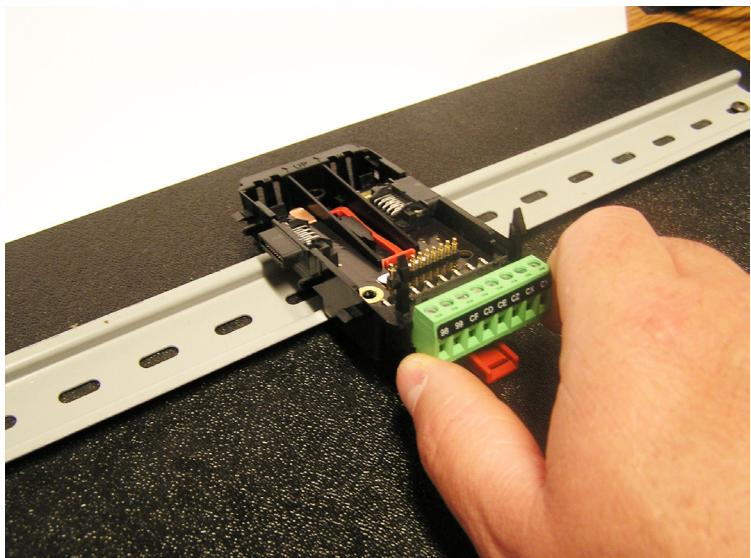
The picture on the right shows the Modular Backplane Connector, both front and rear view. The rear view is bringing in to focus a metal clip. If the DIN rail is grounded the Modular Backplane Connector and the module connected to it will be also (recommended).



Installing the Modular Backplane Connector

To install the backplane follow the steps below:

1. Hook backplane assembly to upper edge of DIN rail, (see rear view above, backplane hook detail that mates with upper rail edge is circled)
2. Next, rotate back plane assembly downward to engage the lower edge of the rail. (Note: Din Rail clipping distance ranges from 1.366 -1.389 inches. The back plane assembly will not latch onto the rail successfully if the rail is out of dimension).
3. For final positioning and locking, the red tab is to be pushed upward to further engage the bottom edge of the rail with an over center snap action latch. (The red locking tab protrudes from the bottom side of the back plane assembly).



Note:

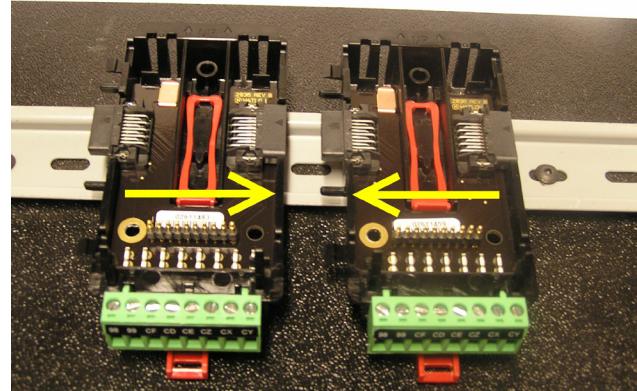
For easy removal and placement of modules it is recommended that there be a 76.2 mm (3.00 in) clearance on the top, bottom and front of each module.

Installing Multiple Modular Backplane Connectors

Multiple modules are easily aligned and latched together. Each module includes matched mating geometry that facilitates accurate and consistent interconnections.

To install backplane connectors follow the steps below:

1. Attach individual modules to the rail separately.
2. Laterally slide the modules together until they touch.
3. When the multi-module system is attached and laterally positioned to the desired placement the locking tab should be engaged to secure the control system to the rail.

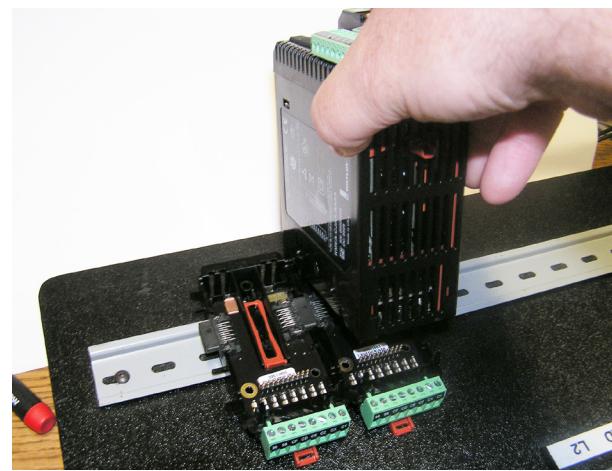
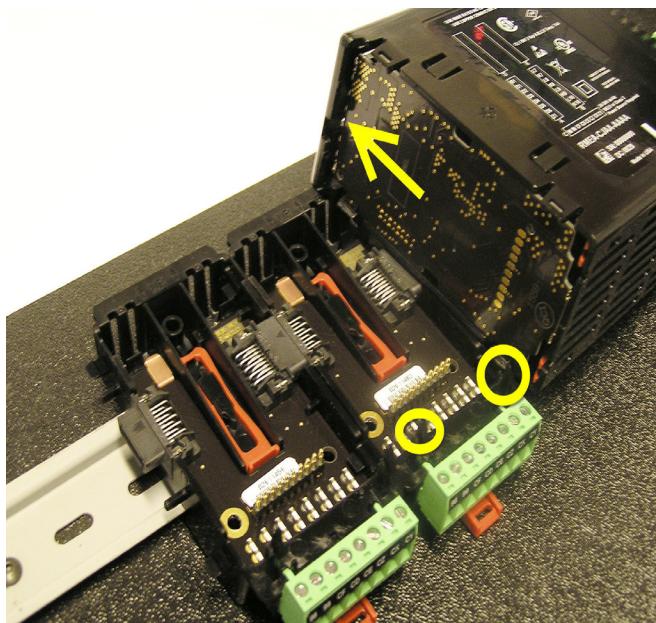


Module Installation

In the picture to the right notice that the arrow is pointing at the top lip of the module (on side).

To install modules on the backplane follow the steps below:

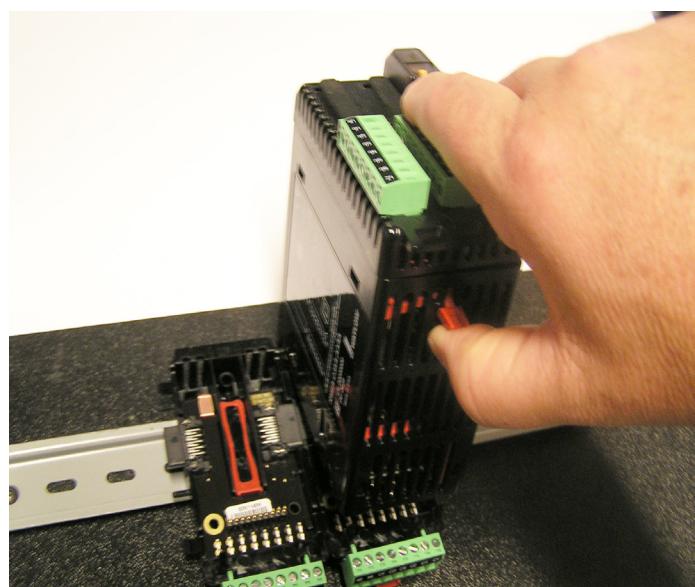
1. Slide the lip of the module over the top of the Modular Backplane Connector and then push down on the rear of the module. The module will then slide over the two posts just above the green connector (see pictures below).



Module Removal

To remove a module from the backplane follow the steps below:

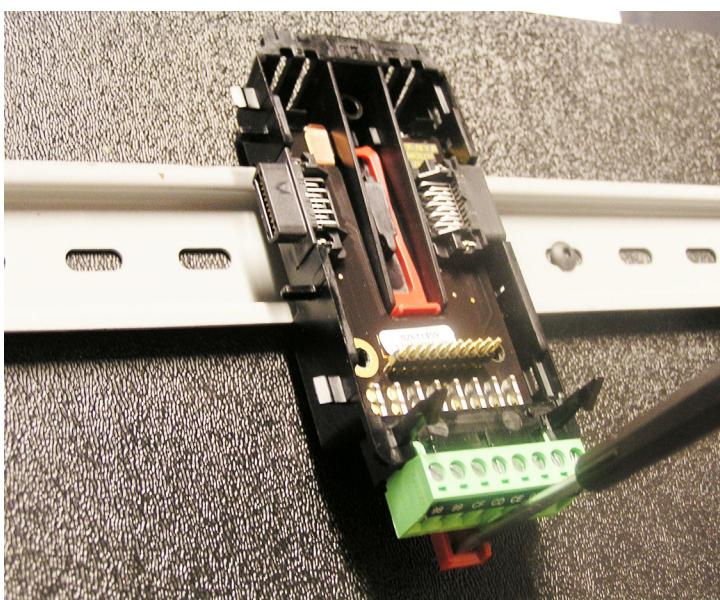
1. Find the red tab protruding from the bottom of the module and pull back on it as shown to the right.
2. Pull back on the red tab, the two mounting posts will then release the module.
3. Lift the module up and slide it up; this will release the module lip from the backplane.



Backplane Removal from DIN Rail

To remove a modular backplane connector from the DIN rail follow the steps below:

1. Insert a screw driver into the red locking tab just behind the green connector.
2. Apply downward pressure on the tab by lifting the screwdriver upwards..
3. When released, the tab will move downward and the connector can then be lifted up off of the DIN rail.



Wiring

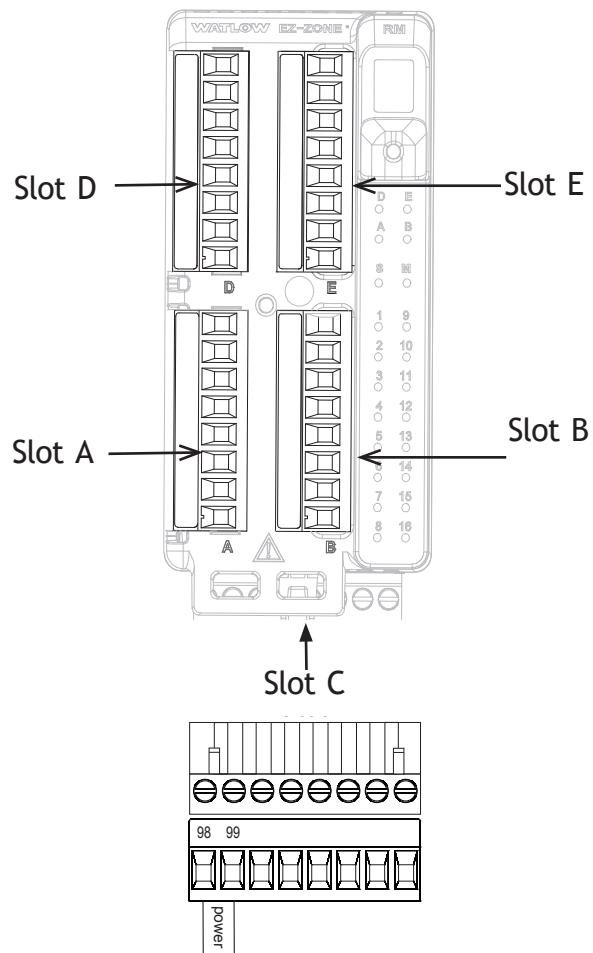
Scanner Module (R M S x - x x x x - x x x x)					
Slot A	Slot B	Slot D	Slot E	Terminal Function	Configuration
Inputs				Universal, RTD, Potentiometer and Thermistor Inputs 1 - 16	
1 - 4	5 - 8	9 - 12	13 - 16		
S1 R1 S2 R2 S3 R3 S4 R4	S5 R5 S6 R6 S7 R7 S8 R8	S9 R9 S10 R10 S11 R11 S12 R12	S13 R13 S14 R14 S15 R15 S16 R16	S_ (RTD), thermocouple -, volts - , mA -, potentiometer wiper or thermistor R_ (RTD), thermocouple +, volts +, mA +, potentiometer or thermistor	Universal/Thermistor Input Part # Digits 5, 6, 7, 8 Input 1-4: RMSx-[R,P]xxx-xxxx Input 5-8: RMSx-x[R,P]xx-xxxx Input 9-12: RMSx-xx[R,P]x-xxxx Input 13-16: RMSx-xxx[R,P]-xxxx
				Digital Inputs 1 - 6 and 7 - 12	
		1 - 6	7-12		
---	---	B1 D1 D2 D3 D4 D5 D6 Z1	B7 D7 D8 D9 D10 D11 D12 Z7	Common DC +input DC +input DC +input DC +input DC +input DC +input Internal Supply	Digital Inputs (DI) Part # Digit 7, 8 Slot A: Option not valid Slot B: Option not valid Slot D: RMSx-xx[C]x-xxxx Slot E: RMSx-xxx[C]-xxxx
				Digital Input 9	
---	---	---	9		
---	---	---	---		Digital Input (DI) Part # Digit 8 Slot A: Option not valid Slot B: Option not valid Slot D: Option not valid Slot E: RMSx-xxx[B]-xxxx
---	---	---	B9 D9	Common DC +input	
Outputs				Form A - Mechanical Relay Outputs 1- 4 and 7 - 10	
---	---	1 - 4	7 - 10		
---	---	L1 K1 L2 K2 L3 K3 L4 K4	L7 K7 L8 K8 L9 K9 L10 K10	normally open common normally open common normally open common normally open common	Mechanical Relay 5 A, Form A Part # Digits 7, 8 Slot D: : RMSx-xx[J]x-xxxx Slot E: : RMSx-xxx[J]-xxxx
				Digital Outputs 1 - 6 and 7 - 12	
---	---	1 - 6	7 - 12		
---	---	B1 D1 D2 D3 D4 D5 D6 Z1	B7 D7 D8 D9 D10 D11 D12 Z7	Common open collector/ switched dc open collector/ switched dc Internal Supply	Digital Outputs (DO) Part # Digit 7, 8 Slot A: Option not valid Slot B: Option not valid Slot D: RMSx-xx[C]x-xxxx Slot E: RMSx-xxx[C]-xxxx

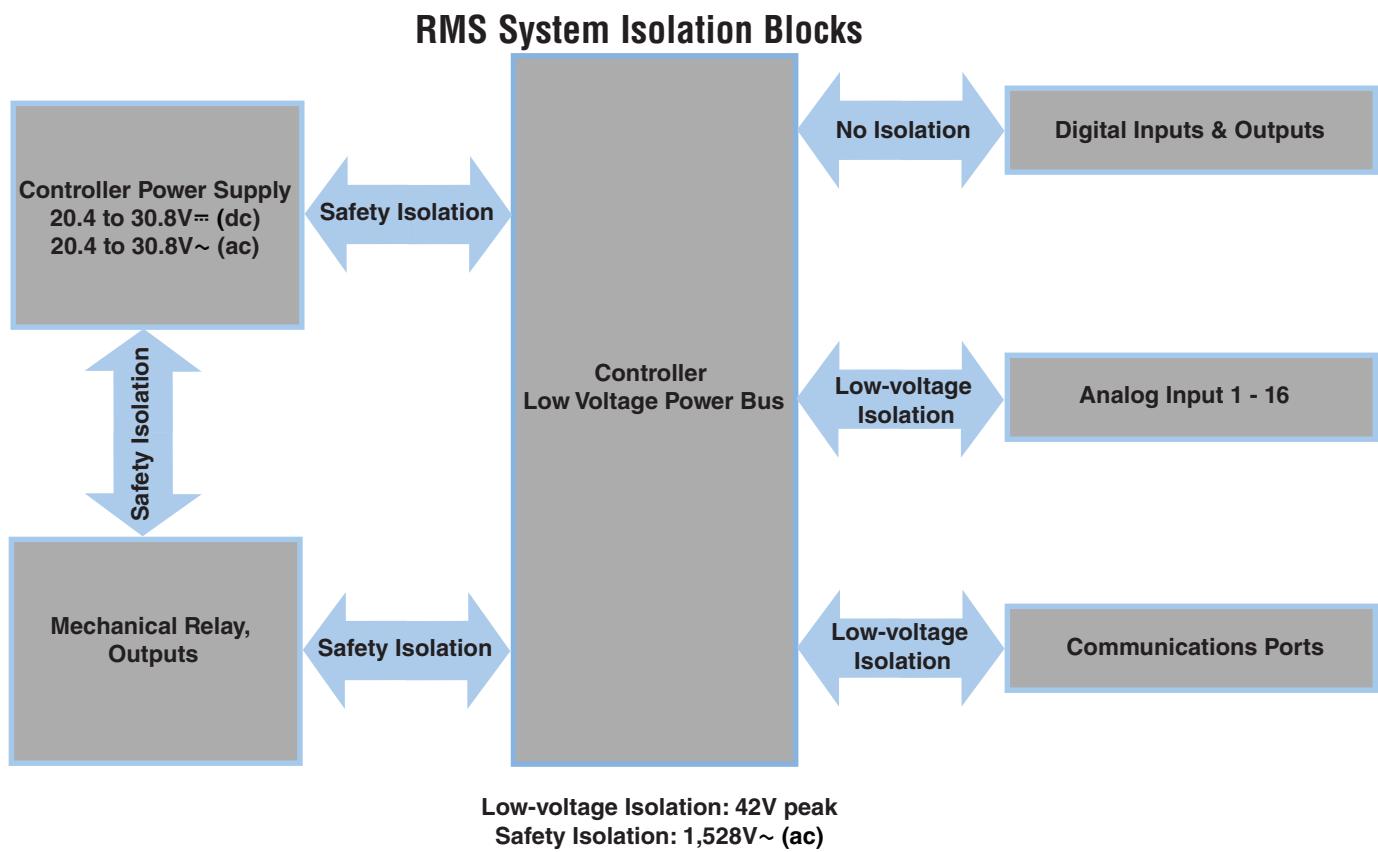
Wiring (cont.)

Slot A	Slot B	Slot D	Slot E	Terminal Function	Configuration
Outputs (cont.)				Form C - Mechanical Relay Output 7 and Form A - Mechanical Relay Output 8	
- - -	- - -	- - -	7, 8		
- - -	- - -	- - -	L7	normally open	Form C and Form A Relay Outputs Part # Digit 8
- - -	- - -	- - -	K7	common	Slot A: Option not valid
- - -	- - -	- - -	J7	normally closed	Slot B: Option not valid
- - -	- - -	- - -	L8	normally open	Slot D: Option not valid
- - -	- - -	- - -	K8	common	Slot E: RMSx-xxx[B]-xxxx
				Quad 2A - Solid-State Relay (SSR) Form A Outputs	
- - -	- - -	1 - 4	7 - 10		
- - -	- - -	L1	L7	normally open	2A SSR Outputs
- - -	- - -	K1	K7	common	Part # Digits 7, 8
- - -	- - -	L2	L8	normally open	Slot A: Option not valid
- - -	- - -	- - -	- - -	<i>not used</i>	Slot B: Option not valid
- - -	- - -	- - -	- - -	<i>not used</i>	Slot D: RMS _ - _ _ [L] _ - _ _
- - -	- - -	L3	L9	normally open	Slot E: RMS _ - _ _ [L] _ - _ _
- - -	- - -	K3	K9	common	
- - -	- - -	L4	L10	normally open	
				Tri-State Process/Retransmit Outputs	
- - -	- - -	1 - 3	7 - 9		
- - -	- - -	F1	F7	voltage or current -	Tri-Process Outputs
- - -	- - -	H1	H7	voltage + or current +	Part # Digits 7, 8
- - -	- - -	- - -	- - -	<i>not used</i>	Slot A: Option not valid
- - -	- - -	F2	F8	voltage or current -	Slot B: Option not valid
- - -	- - -	H2	H8	voltage + or current +	Slot D: RMS _ - _ _ [F] _ - _ _
- - -	- - -	- - -	- - -	<i>not used</i>	Slot E: RMS _ - _ _ [F] _ - _ _
- - -	- - -	F3	F9	voltage or current -	
- - -	- - -	H3	H9	voltage + or current +	

Power and Communications		
Slot C	Terminal Function	Configuration
98	Power input: ac or dc+	All
99	Power input: ac or dc-	
CF	Standard Bus EIA-485 common	Standard Bus
CD	Standard Bus EIA-485 T-/R-	Part # Digit 10
CE	Standard Bus EIA-485 T+/R+	RMSx-xxxx-x[A]xx
CC	Standard Bus or Modbus RTU EIA-485 common	Standard Bus or Modbus
CA	Standard Bus or Modbus RTU EIA-485 T-/R-	Part # Digit 10
CB	Standard Bus or Modbus RTU EIA-485 T+/R+	RMSx-xxxx-x[1]xx
CZ	Inter-module Bus	Inter-module Bus
CX	Inter-module Bus	
CY	Inter-module Bus	

RMS Module - Front View - Standard Connector





Warning: !

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning: !

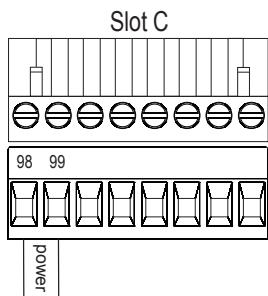
Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning: !

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Scanner Module Wiring (RMSx-xxxx-xxxx)

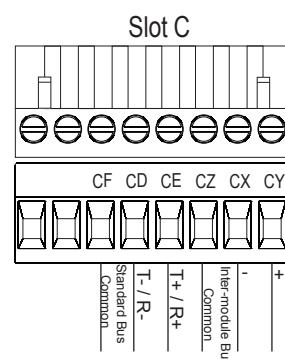
Low Power



RMS- ALL Model Numbers

- 20.4 to 30.8 V ~ (ac) / == (dc) 14VA
- 47 to 63 Hz
- Controller module power consumption, 7 Watts maximum
- 31 Watts maximum power available for P/S part #:0847-0299-0000
- 60 Watts maximum power available for P/S part #:0847-0300-0000
- 91 Watts maximum power available for P/S part #:0847-0301-0000
- Class 2 or Safety Extra Low Voltage (SELV) power source required to meet UL compliance standards

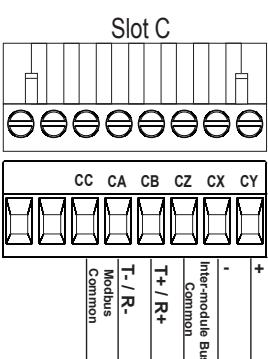
Communications



RMS Part # Digit 10 is A

- CF, CD, CE - Standard Bus EIA485 Communications
- CZ, CX, CY - Inter-module Bus EIA485 Communications
- Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network

Communications



RMS Part # Digit 10 is 1

- CC, CA, CB - Modbus and Standard Bus EIA-485 Communications (selectable via push button under zone address)
- CZ, CX, CY - Inter-module Bus EIA-485 Communications
- Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network

Warning: 

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

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- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning: 

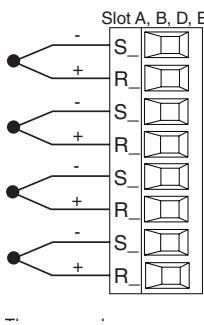
Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning: 

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Inputs 1 through 16 Thermocouple

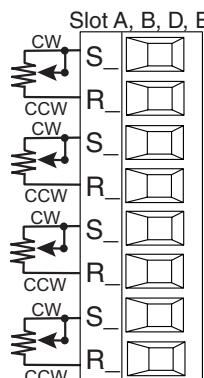
RMS Part # Digits 5, 6, 7, 8



- 2K Ω maximum source resistance >20 MΩ input impedance
- 3 microampere open-sensor detection
- Thermocouples are polarity sensitive. The negative lead (usually red) must be connected to S terminal
- To reduce errors, the extension wire for thermocouples must be of the same alloy as the thermocouple.
 - Input 1 - 4 (top to bottom): RMSx-(R)xxxx-xxxx
 - Input 5 - 8 (top to bottom): RMSx-x(R)xx-xxxx
 - Input 9 - 12 (top to bottom): RMSx-xx(R)x-xxxx
 - Input 13 - 16 (top to bottom): RMSx-xxx(R)-xxxx

Inputs 1 through 16 Potentiometer

RMS Part # Digits 5, 6, 7, 8



- Use a 1 kΩ potentiometer.
 - Input 1 - 4 (top to bottom): RMSx-(R)xxxx-xxxx
 - Input 5 - 8 (top to bottom): RMSx-x(R)xx-xxxx
 - Input 9 - 12 (top to bottom): RMSx-xx(R)x-xxxx
 - Input 13 - 16 (top to bottom): RMSx-xxx(R)-xxxx

Warning: 

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

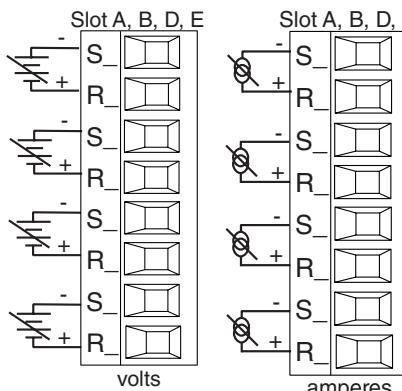
Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning: 

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

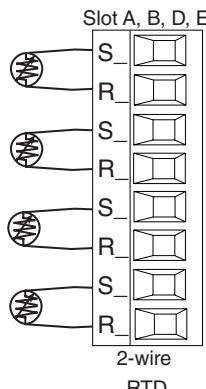
Warning: 

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Inputs 1 through 16 Process

RMS Part # Digits 5, 6, 7, 8

- 0 to 20 mA @ 100 Ω input impedance
- 0 to 10V= (dc) @ 20 kΩ input impedance
- 0 to 50 mV= (dc) @ 20 MΩ input impedance
- Scalable
 - Input 1: RMS(1,3,5)xxxxxxxxxxxxx (S1-/R1+),(T1+/S1-)
 - Input 2: RMSxx(1,5)xxxxxxxxxxxxx (S2-/R2+),(T2+/S2-)
 - Input 3: RMSxxxx(1,5)xxxxxxxxxxxxx (S3-/R3+),(T3-S3-R3)
 - Input 4: RMSxxxxxx(1,5)xxxxxx (S4-/R4+),(T4+/S4-)

Inputs 1 through 16 RTD

RMS Part # Digits 5, 6, 7, 8

- Platinum, 100 and 1,000 Ω @ 0°C
- Calibration to DIN curve (0.00385 Ω/Ω/°C)
- RTD excitation current of 0.09 mA typical. Each ohm of lead resistance may affect the reading by 2.55°C for a 100 ohm platinum sensor or 2.5 ohms for a 1000 ohm sensor.

AWG	Ohms/1000ft
14	2.575
16	4.094
18	6.510
20	10.35
22	16.46
24	26.17
26	41.62
28	66.17

- Input 1 - 4 (top to bottom): RMSx-(R) xxx-xxxx
- Input 5 - 8 (top to bottom): RMSx-x(R) xx-xxxx
- Input 9 - 12 (top to bottom): RMSx-xx(R) x-xxxx
- Input 13 - 14 (top to bottom): RMSx-xxx(R)-xxxx

Warning: !

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

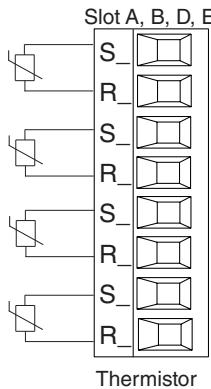
Warning: !

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning: !

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Inputs 1 through 16 Thermistor

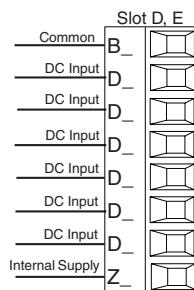


RMS Part # Digits 5, 6, 7, 8

- >20 MΩ input impedance
 - Input 1 - 4 (top to bottom): RMSx-(P) xxx-xxxx
 - Input 5 - 8 (top to bottom): RMSx-x(P) xx-xxxx
 - Input 9 - 12 (top to bottom): RMSx-xx(P)x-xxxx
 - Input 13 - 16 (top to bottom): RMSx-xxx(P)-xxxx

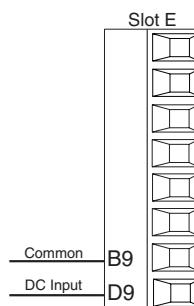
Digital Inputs 1 through 12

RMS Part # Digit 7, 8 is C and or B Respectively

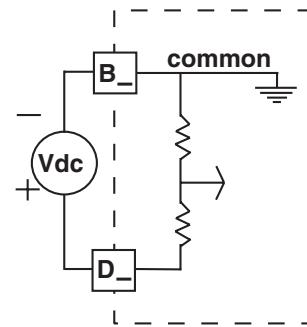


Digital Input Event Conditions

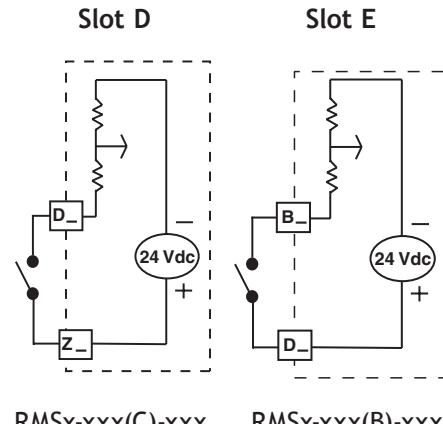
- Voltage
 - Input inactive when < 2V
 - Input active when > 3V
- Dry Contact
 - Input inactive when > 100KΩ
 - Input active when < 50Ω
- Six user configurable digital inputs/outputs per slot
 - Slot D DI 1 - 6 RMSx-xx(C) xx-xxxx
 - Slot E DI 7 - 12 RMSx-xx(C)-xxxx
 - Slot E DI 9, RMSx-xx(B)-xxxx



Voltage Input



Dry Contact



RMSx-xx(C)-xxx RMSx-xx(B)-xxx

Note:

For part number RMSx-xx(B)-xxxx connection is made between pins B9 and D9 when configured as a dry contact (Digital Input 9 Slot E).

Warning: !

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Note:

If the last two digits of the part number are "12", this equipment is suitable for use in CLASS I, DIVISION 2, Groups A, B, C and D or Non-Hazardous locations only. Temperature Code T4

Warning: !

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

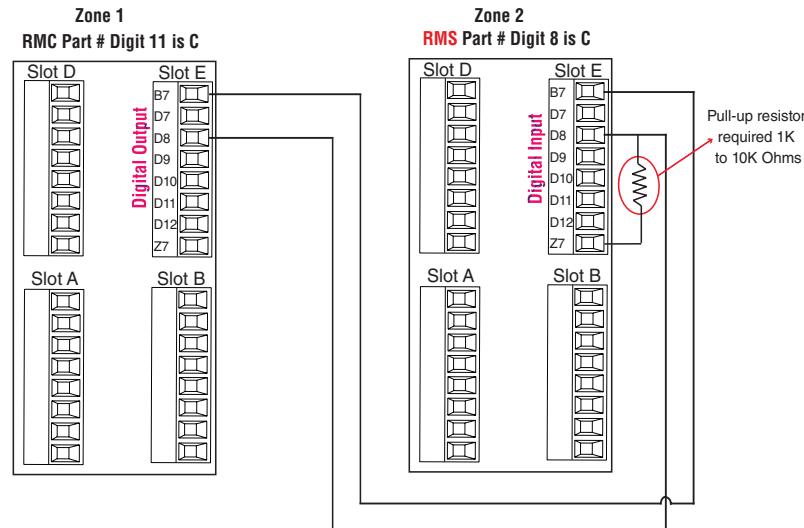
Warning: !

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Quencharc Note:

Switching pilot duty inductive loads (relay coils, solenoids, etc.) with the mechanical relay, solid state relay or open collector output options requires use of an R.C. suppressor.

Connecting a Digital Output from One Zone (RMC - Zone 1) to a Digital Input of Another Zone (RMS - Zone 2)

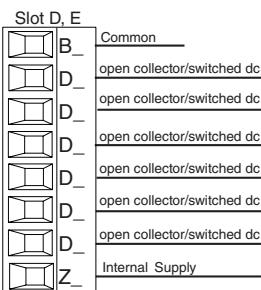


In the example above, digital output D8 from Zone 1 is connected to digital input D8 of Zone 2.

Note:

As shown in the graphic above, for this configuration, a pull-up resistor is required.

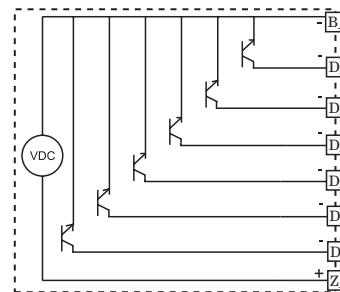
Digital Outputs 1 - 12



RMS Part # Digit 7, 8 is C

- Maximum switched voltage is 32V_{dc}(dc)
- Internal supply provides a constant power output of 750mW
- Maximum output sink current per output is 1.5A (external class 2 or *SELV supply required)
- Total sink current for all outputs not to exceed 8A
- Do not connect outputs in parallel
 - Slot D DO 1 - 6 RMSx-xx(C)x-xxxx
 - Slot E DO 7 - 12 RMSx-xxx(C)-xxxx
- * Safety Extra Low Voltage

Open Collector/Switched DC Outputs



Warning: !

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Note:

If the last two digits of the part number are "12", this equipment is suitable for use in CLASS I, DIVISION 2, Groups A, B, C and D or Non-Hazardous locations only. Temperature Code T4

Warning: !

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

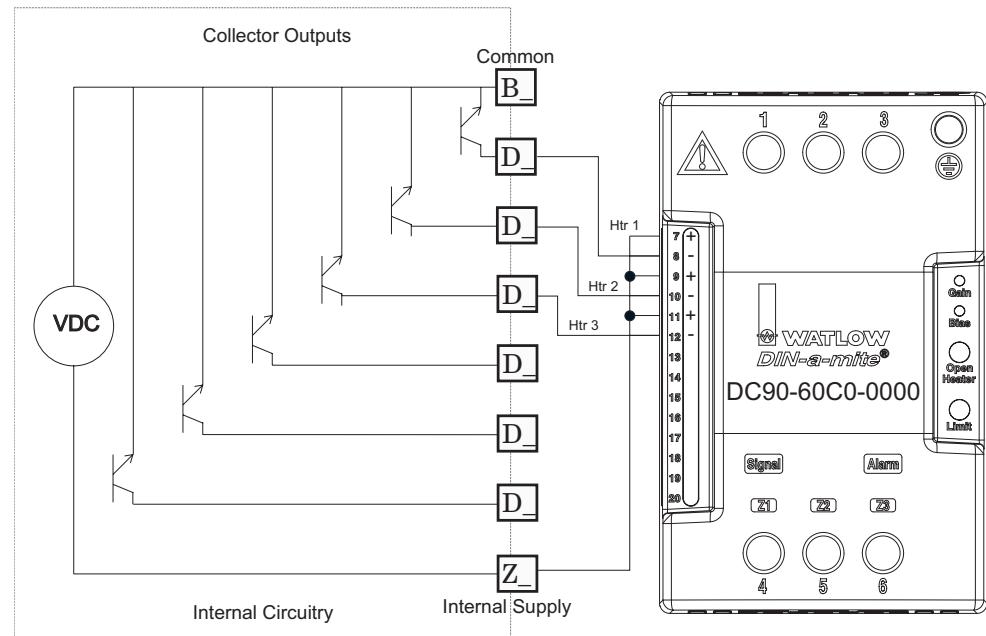
Warning: !

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Quencharc Note:

Switching pilot duty inductive loads (relay coils, solenoids, etc.) with the mechanical relay, solid state relay or open collector output options requires use of an R.C. suppressor.

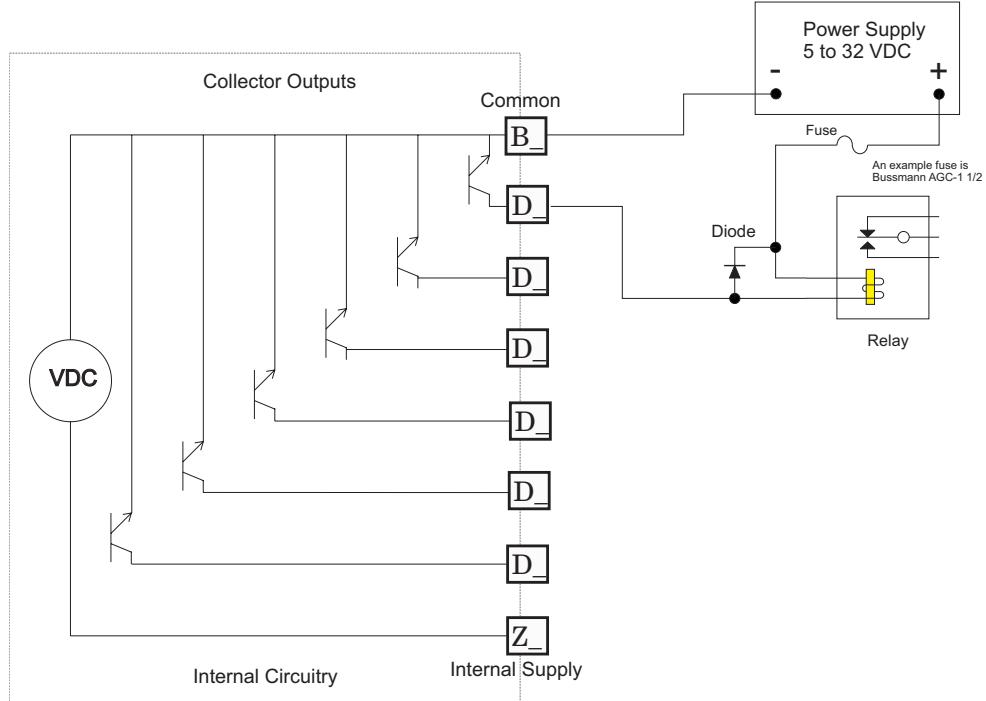
Switched DC Wiring Example Using DO 1-12



Note:

As a switched DC output; this output is a constant current output delivering 750 mW, current limited to 400 mA. The internal supply does have a maximum open circuit voltage of 22 VDC and minimum open circuit voltage of 19 VDC. Pin Z_ is shared to all digital outputs. This type of output is meant to drive solid-state relays, not mechanical relays.

Open Collector Wiring Example Using DO 1-12



Warning: !

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Note:

If the last two digits of the part number are "12", this equipment is suitable for use in CLASS I, DIVISION 2, Groups A, B, C and D or Non-Hazardous locations only. Temperature Code T4

Warning: !

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning: !

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Quencharc Note:

Switching pilot duty inductive loads (relay coils, solenoids, etc.) with the mechanical relay, solid state relay or open collector output options requires use of an R.C. suppressor.

As an open collector output (see graphic below), use an external power supply with the negative wired to B₋, the positive to the coil of a pilot mechanical relay and the other side of the coil wired to the output of choice (D₋). Each open collector output can sink 1.5 A with the total for all open collector outputs not exceeding 8 amperes. Ensure that a kickback diode is reversed wired across the relay coil to prevent damage to the internal transistor.

Output 1 - 4 and 7 - 10 Mechanical Relay, Form A

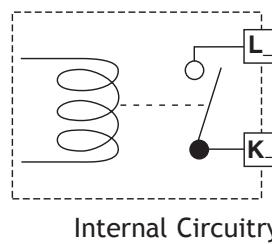
RMS Part # Digit 7, 8 is J

Slot D	L1	normally open
	K1	common
	L2	normally open
	K2	common
	L3	normally open
	K3	common
	L4	normally open
	K4	common

Slot E	L7	normally open
	K7	common
	L8	normally open
	K8	common
	L9	normally open
	K9	common
	L10	normally open
	K10	common

- 5 A at 240V~ (ac) or 30V== (dc) maximum resistive load
 - 20 mA at 24V minimum load
 - 125 VA pilot duty @ 120/240V~ (ac), 25 VA at 24V~ (ac)
 - 100,000 cycles at rated load
 - Output does not supply power.
 - For use with ac or dc
- See Quencharc note.
- Slot D Outputs 1 - 6
RMSx-xx(J)x-xxxx
 - Slot E Outputs 7 - 10
RMSx-xxx(J)-xxxx

Mechanical Relay Form A



Warning: 

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning: 

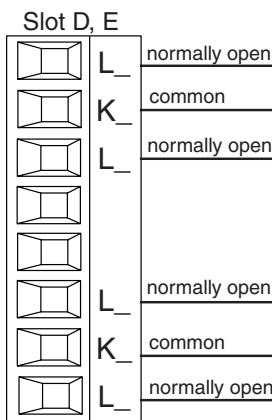
Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning: 

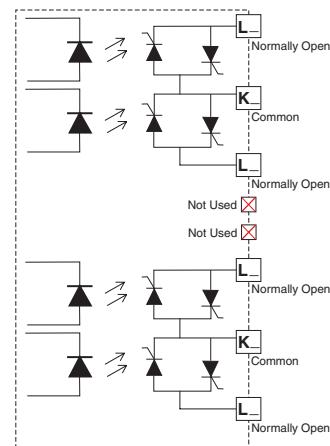
Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Quad 2A SSR Outputs 1-4, 7-10

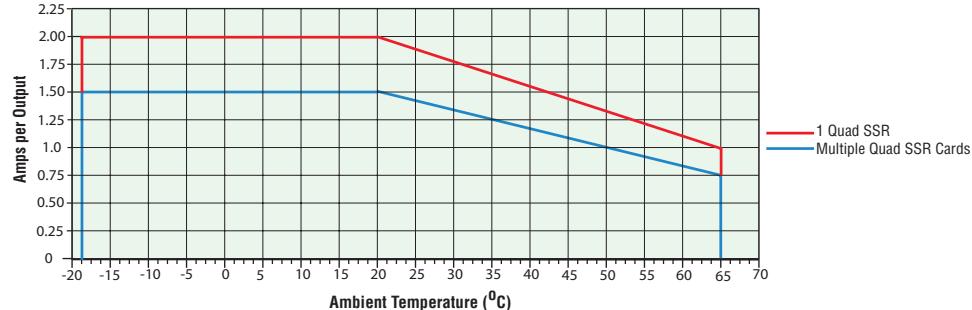
RMS Part # Digit 7, 8 is L



- 2 A at 20 to 264V~ (ac) maximum resistive load
 - 50 VA 120/240V~ (ac) pilot duty
 - Optical isolation, without contact suppression
 - Maximum off state leakage of 105 microamperes
 - Output does not supply power.
 - Do not use on dc loads.
 - N.O., COM, N.O wiring (shared common) between each set of outputs.
 - Minimum holding current 10mA
- See Quencharc note.



Quad 2 Amp SSR Derating Curve - All Outputs 100% Duty Cycle

**Note:**

Each of the four SSR outputs has internal circuitry that will protect it from over heating. Outputs may be disabled (shut off) automatically if internal temperatures exceed those listed in the graph above. After the output temperature drops approximately 10 °C the outputs will once again be enabled for operation.

Warning: 

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning: 

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning: 

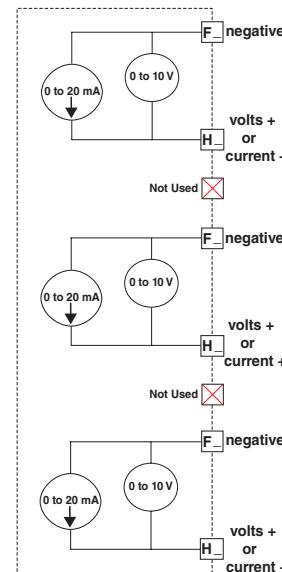
Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Tri-Process/Retransmit Outputs 1-3, 7-9

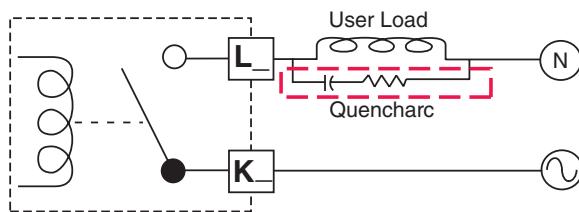
RMS Part # Digit 7, 8 is F

Slot D, E	F_	volts or current -
	H_	volts +/current +
	F_	volts or current -
	H_	volts +/current +
	F_	volts or current -
	H_	volts +/current +

- 0 to 20 mA into 400Ω maximum load
- 0 to 10V_{dc} into 4 kΩ minimum load
- Outputs are scalable
- Output supplies power
- Each output can be independently set for voltage or current.
- Output may be used as retransmit or control.

**Quencharc Wiring Example**

- In this example the Quencharc circuit (Watlow part# 0804-0147-0000) is used to protect internal circuitry from the counter electromagnetic force from the inductive user load when deenergized. It is recommended that this or an equivalent Quencharc be used when connecting inductive loads to outputs.



Warning: 

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

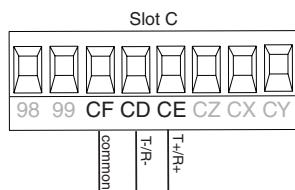
Warning: 

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning: 

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Standard Bus EIA-485 Communications



- Wire T-/R- to the A terminal of the EIA-485 port.
- Wire T+/R+ to the B terminal of the EIA-485 port.
- Wire common to the common terminal of the EIA-485 port.
- Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network.
- A 120 Ω termination resistor may be required across T+/R+ and T-/R-, placed on the last controller on the network.
- Do not connect more than 16 EZ-ZONE RM controllers on a network.
- Maximum network length: 1,200 meters (4,000 feet)
- 1/8th unit load on EIA-485 bus

RMSx-xxxx-x(A)xx

* All models include Standard Bus communications

Warning: 

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- 0.0507 to 3.30 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.57 Nm (5.0 in-lb.) torque

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

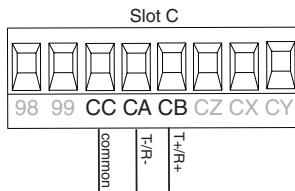
Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning: 

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning: 

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Modbus RTU or Standard Bus EIA-485 Communications

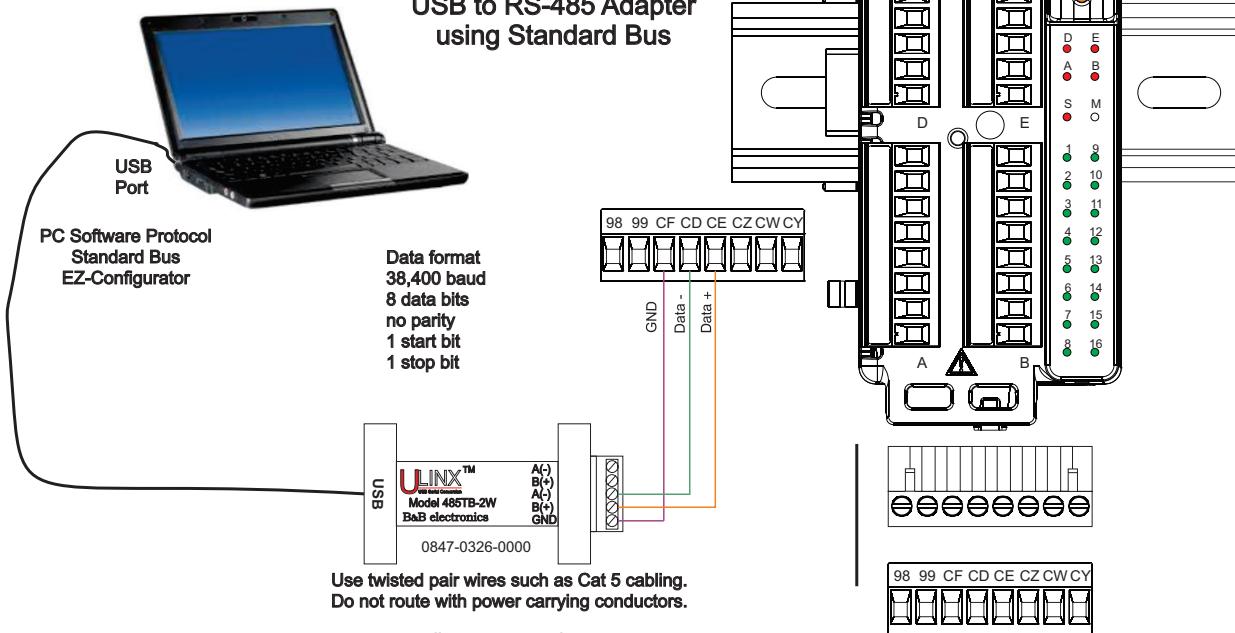
- Wire T-/R- to the A terminal of the EIA-485 port.
- Wire T+/R+ to the B terminal of the EIA-485 port.
- Wire common to the common terminal of the EIA-485 port.
- Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network.
- A termination resistor may be required. Place a 120 Ω resistor across T+/R+ and T-/R- of last controller on network.
- Only one protocol per port is available at a time: either Modbus RTU or Standard Bus.
- Do not connect more than 16 EZ-ZONE controllers on a Standard Bus network.
- Maximum number of EZ-ZONE controllers on a Modbus network is 247.
- Maximum network length: 1,200 meters (4,000 feet)
- 1/8th unit load on EIA-485 bus
- RMSx-xxxx-x(1)xx

Modbus-IDA Terminal	EIA/TIA-485 Name	Watlow Terminal Label	Function
DO	A	CA or CD	T-/R-
D1	B	CB or CE	T+/R+
common	common	CC or CF	common

Note:

Do not leave a USB to EIA-485 converter connected to Standard Bus without power (i.e., disconnecting the USB end from the computer while leaving the converter connected on Standard Bus). Disturbance on the Standard Bus may occur.

**EZ-ZONE® RM
to B&B Converter
Model ULINX™ 485USBTB-2W
USB to RS-45 Adapter
using Standard Bus**



**EZ-ZONE® RM
to Serial Gear Converter
Model USB-COMi-M**

Screw terminal connector pin-out:

- 1 is Data -(A), connects to pin CD or CA
- 2 is Data +(B), connects to pin CE or CB
- 6 is GND, connects to pin CF or CC

DB9 connector, EIA485 half duplex pin-out:

- 1 is Data -(A), connects to pin CD or CA
- 2 is Data +(B), connects to pin CE or CB
- 5 is GND, connects to pin CF or CC

DB9 connector, EIA232 pin-out:

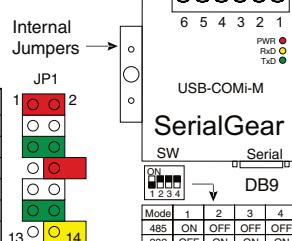
- 1 is DCD
- 2 is RXD
- 3 is TXD
- 4 is DTR
- 5 is Gnd
- 6 is DSR



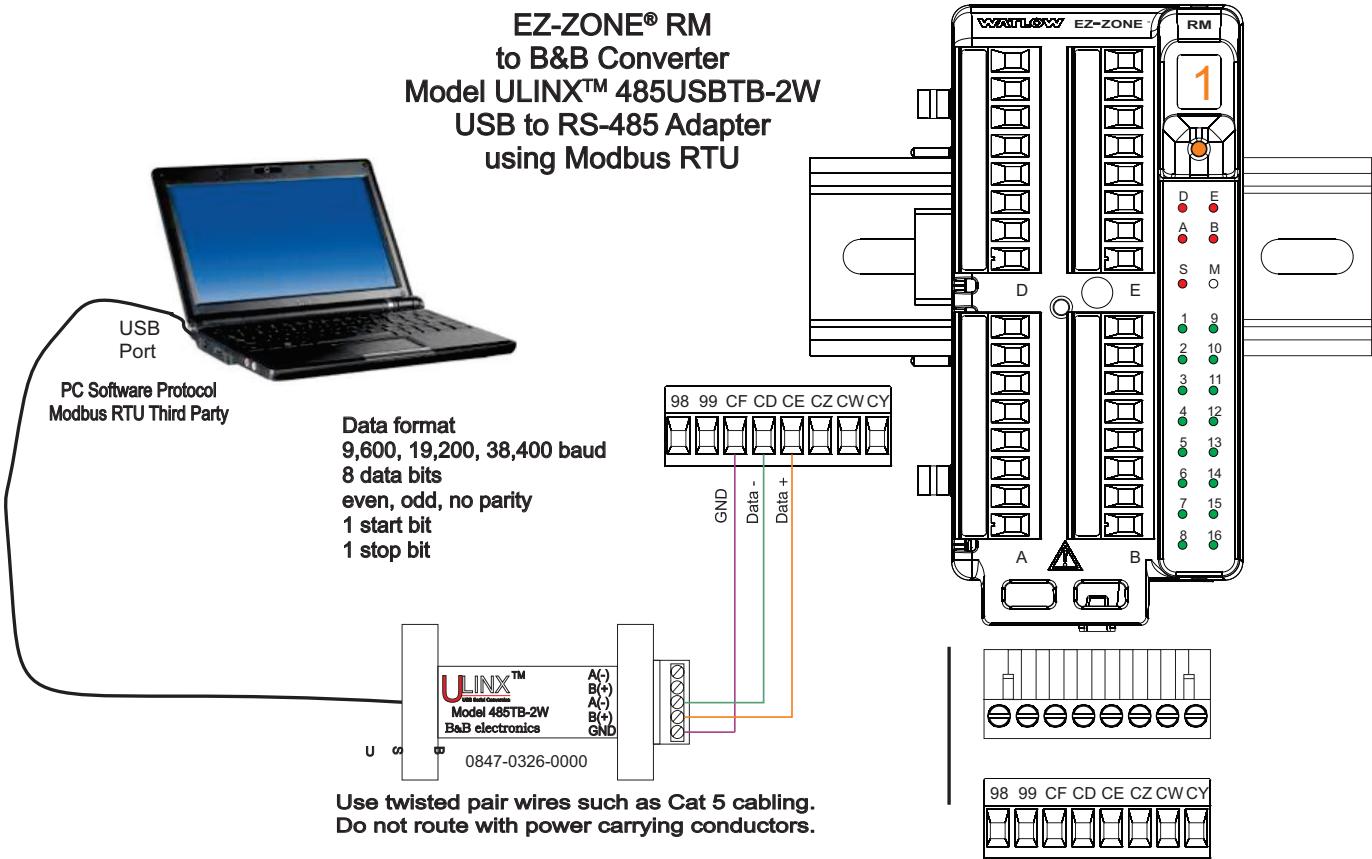
Use twisted pair wires such as Cat 5 cabling.
Do not route with power carrying conductors.
Daisy chain wire up to 247 EZ-ZONE® devices.

If first device on 485 network, set jumpers as shown

1 - 2	Tx termination 120 ohm
3 - 4	Tx pull-up 750 ohm
5 - 6	Tx pull-down 750 ohm
7 - 8	Rx termination 120 (422)
9 - 10	Rx pull-up 750 ohm
11 - 12	Rx pull-down 750 ohm
13 - 14	CTS termination 120 (422)



<http://serialgear.com/1-Port-Serial-USB-USB-COMi-M.html>



Note:

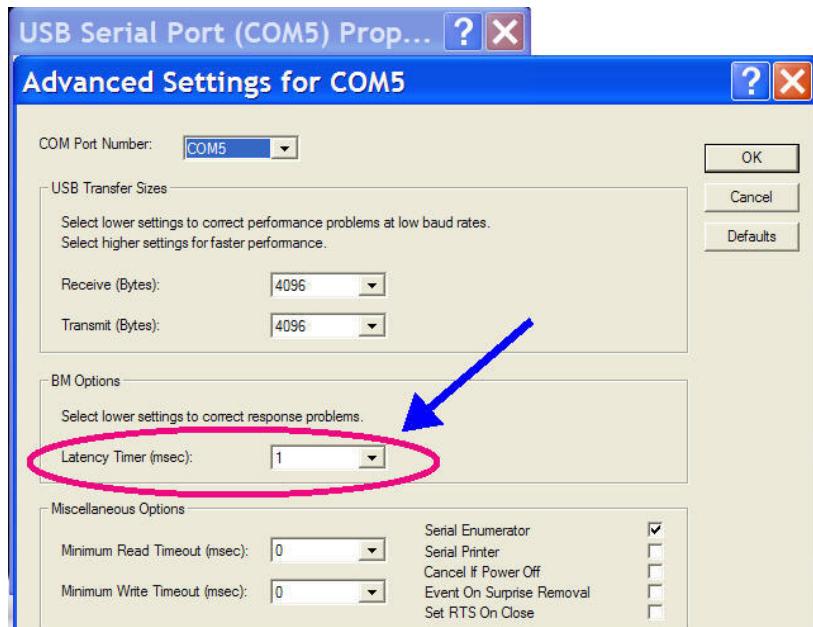
Do not leave a USB to EIA-485 converter connected to Standard Bus without power (i.e., disconnecting the USB end from the computer while leaving the converter connected on Standard Bus). Disturbance on the Standard Bus may occur.

Note:

When connecting the USB converter to the PC it is suggested that the Latency Timer be changed from the default of 16 msec to 1 msec. Failure to make this change may cause communication loss between the PC running ZE-ZONE Configurator software and the control.

To modify Latency Timer settings follow the steps below:

1. Navigate to **Device Manager** on the PC.
2. Double click on **Ports**.
3. Right click on the USB serial port in use and select **Properties**.
4. Click the tab labeled **Port settings** and then click the **Advance** button.



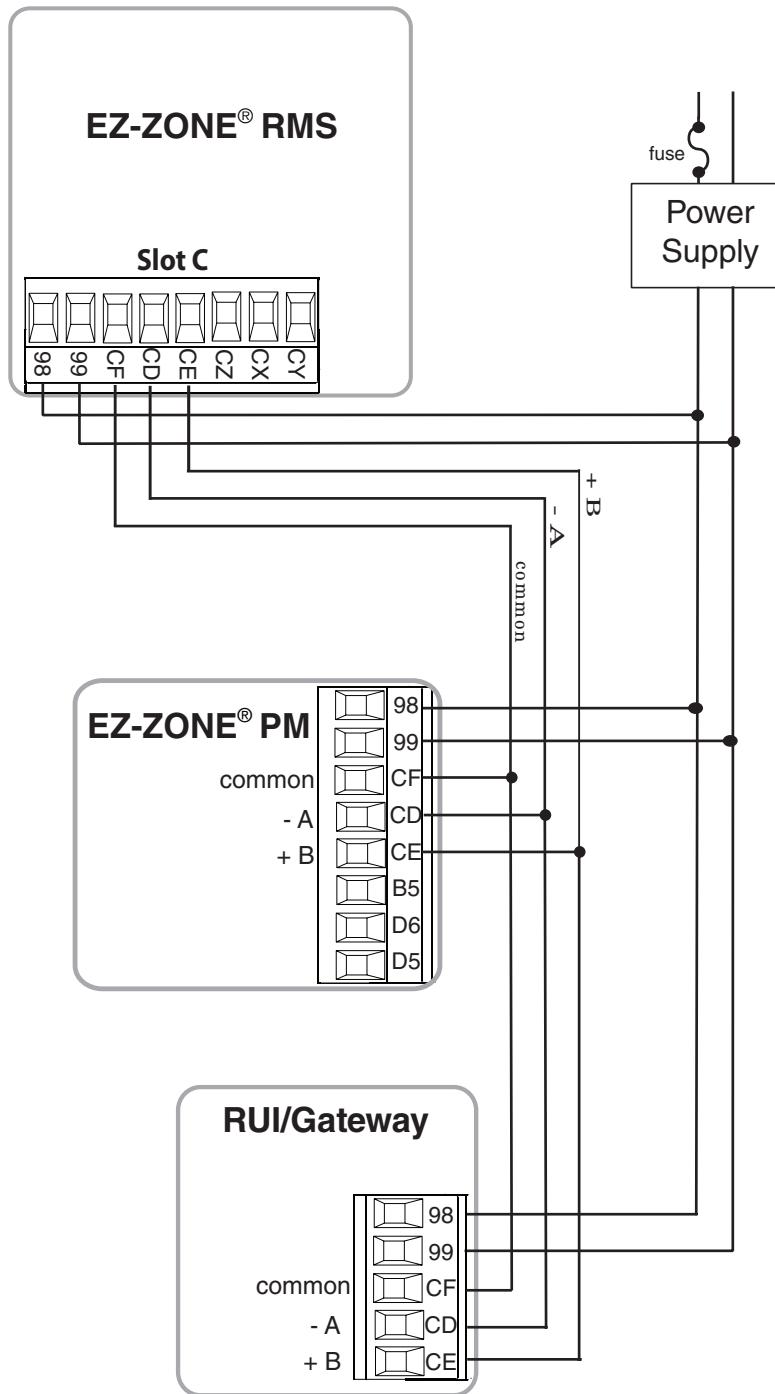
Wiring a Serial EIA-485 Network

Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network. Only one protocol per port is available at a time: either Modbus RTU or Standard Bus.

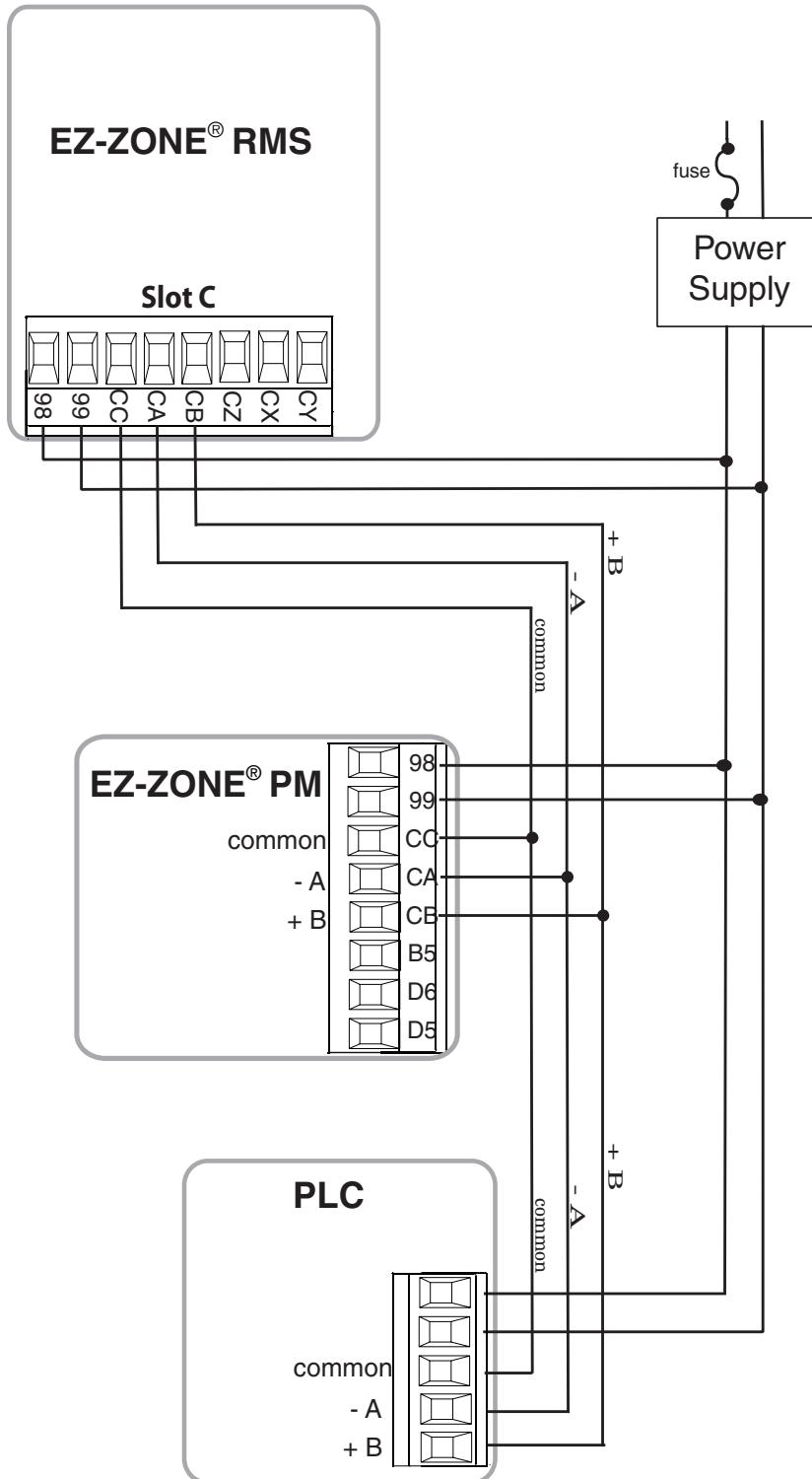
Note:

A termination resistor is required. Place a $120\ \Omega$ resistor across T+/R+ and T-/R- of the last controller on a network.

A network using Watlow's Standard Bus and an RUI/Gateway.



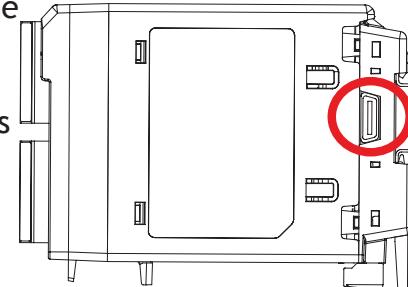
A network using Modbus RTU



Connecting the Modules

RM System Connections

The RMS module can be installed as a stand-alone module or it can be interconnected on the DIN rail as shown below. When modules are connected together as shown, power and communications are shared between modules over the modular backplane interconnection (red circle). Therefore, bringing the necessary power and communications wiring to any one module (connector in slot C) is sufficient. The modular backplane interconnect comes standard with every module ordered and is generic in nature, meaning any of the RM modules can use it.



Notice in the split rail system diagram that a single power supply is being used across both DIN rails. One notable consideration when designing the hardware layout would be the available power supplied and the loading affect of all of the modules used. Watlow provides three options for power supplies listed below:

1. 90-264 Vac to 24Vdc @ 31 watts (Part #: 0847-0299-0000)
2. 90-264 Vac to 24Vdc @ 60 watts (Part #: 0847-0300-0000)
3. 90-264 Vac to 24Vdc @ 91 watts (Part #: 0847-0301-0000)

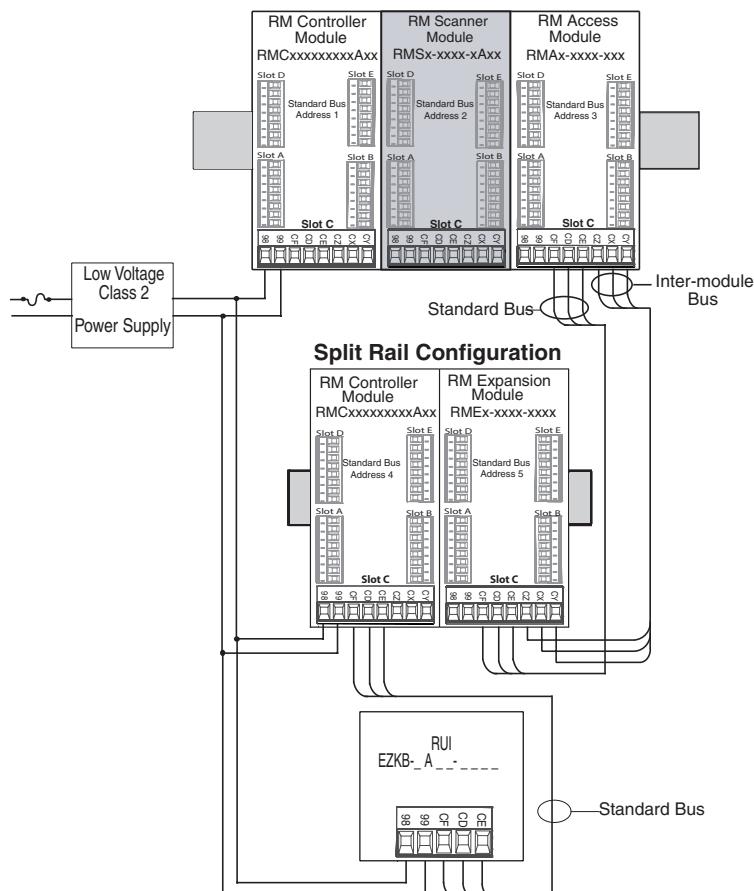
With regards to the modular loading affect, maximum power for each is listed below:

1. RMCxxxxxxxxxxxxx @ 7 watts / 14VA
2. RMEx-xxxx-xxxx @ 7 watts / 14VA
3. RMAX-xxxx-xxxx @ 4 watts / 9VA
4. RMLx-xxxx-xxxx @ 7 watts / 14VA
5. RMHx-xxxx-xxxx @ 7 watts / 14VA
6. RMSx-xxxx-xxxx @ 7 watts / 14VA

So, in the split rail system diagram, the maximum current draw on the supply would be 38 Watts.

- 1 RMC modules consumes 7W
- 1 RME modules consumes 7W
- 1 RMA module consumes 4W
- 1 RMS modules consumes 7W**
- 1 RMH modules consumes 7W
- 1 Remote User Interface consumes 6W

With this power requirement the second or third power supply could be used.



Another hardware configuration scenario that could present itself (graphic not shown) would be a configuration that requires more than one supply. Lets make some assumptions pertaining to the split rail system diagram shown above. The power supply used is the 91W supply. The top DIN rail now has the following modules:

- 2 RMC modules consumes 14W
- 1 RMA consumes 4W
- 11 RME modules consumes 77W

As it can now be understood, the total power requirement exceeds 91W. In this case, another power supply would be required. To incorporate another supply in this system simply disconnect pins 99 and 98 on the remote DIN rail and connect another appropriately sized power supply to those same pins.

When using a split rail configuration ensure that the interconnections for the Inter-module Bus and Standard Bus do not exceed 200 feet. Standard Bus and the Inter-module Buses are different protocols and both are required for split rail configurations. Without having both connected, communications between modules would not be possible.

Note:

Unit is not provided with a disconnect, use of an external disconnect is required. It should be located in close proximity to the unit and be labeled as the disconnect for the unit.

Note:

Connecting power supplies in parallel is not allowed. When power consumption is greater than 91 watts use a split rail configuration.

Conventions Used in the Menu Pages

To better understand the menu pages that follow review the naming conventions used. When encountered throughout this document, the word "default" implies as shipped from the factory. Each page (Operations, Setup and Factory) and their associated menus have identical headers defined below:

Header Name	Definition
Display	Visually displayed information from the control.
Parameter Name	Describes the function of the given parameter.
Range	Defines options available for this prompt, i.e., min/max values (numerical), yes/no, etc... (further explanation below).
Default	Values as delivered from the factory.
Modbus Relative Address	Identifies unique parameters using either the Modbus RTU or Modbus TCP protocols (further explanation below).
CIP (Common Industrial Protocol)	If used in conjunction with an RMA module identifies unique parameters using either the DeviceNet or EtherNet/IP protocol (further explanation below).
Profibus Index	If used in conjunction with an RMA module identifies unique parameters using Profibus DP protocol (further explanation below).
Parameter ID	Identifies unique parameters used with other software such as, LabVIEW.
Data Type and Access (R/W)	uint = Unsigned 16 bit integer dint = Signed 32-bit, long string = ASCII (8 bits per character) float = IEEE 754 32-bit RWES = Readable Writable EEPROM (saved) User Set (saved)

Display

When the RMS module is used in conjunction with the RUI (optional equipment) visual information from the control is displayed to the observer using a fairly standard 7 segment display. Due to the use of this technology, several characters displayed need some interpretation, see the list below:

I = 1	7 = 7	c, C = c	i = i	o = o	u = u
2 = 2	8 = 8	d = d	J = J	P = P	v = v
3 = 3	9 = 9	E = E	K = K	q = q	W = W
4 = 4	0 = 0	F = F	L = L	r = r	y = y
5 = 5	A = A	g = g	M = M	S = S	Z = Z
6 = 6	b = b	h = h	n = n	t = t	

Range

Within this column notice that on occasion there will be numbers found within parenthesis. This number represents the enumerated value for that particular selection. Range selections can be made simply by writing the enumerated value of choice using any of the available communications protocols. As an example, turn to the Control Module Setup Page and look at the Analog Input menu and then the Sensor Type. To turn the sensor off using Modbus simply write the value of 62 (off) to register 388 and send that value to the control.

Communication Protocols

All modules come with the standard offering of Watlow's Standard Bus protocol used primarily for inter-module communications as well as for configuration using EZ-ZONE Configurator software (free download from Watlow's web site (<http://www.watlow.com>)). Along with Standard Bus, the RMS module can also be ordered with Modbus RTU (only one protocol can be active at any given time). The RMA module has options for several different protocols listed below:

- Modbus RTU 232/485
- EtherNet/IP, Modbus TCP
- DeviceNet
- Profibus DP

To learn more about the RM Access module click on the link below. Once there simply type in RM in the Keyword field. <http://www.watlow.com/literature/manuals.cfm>

Modbus RTU Protocol

All Modbus registers are 16-bits and as displayed in this manual are relative addresses (actual). Some legacy software packages limit available Modbus registers to 40001 to 49999 (5 digits). Many applications today require access to all available Modbus registers which range from 400001 to 465535 (6 digits). Watlow controls support 6 digit Modbus registers.

Note:

In this User's Guide all values shown representing Modbus addresses are added to 400,001 or 40,001 to acquire the absolute address. As an example, notice above (under the Range header) the Modbus address identified for Sensor type. Compare this to the value listed for this same parameter found in the Setup Page under the Analog Input Menu.

For parameters listed as float notice that only one (low order) of the two registers is listed, this is true throughout this document. By default, the low order word contains the two low bytes of the 32-bit parameter. As an example, look in the module Operations Page for the Analog Input Value. Find the column identified in the header as Modbus and notice that it lists register 380. Because this parameter is a float it is actually represented by registers 380 (low order bytes) and 381 (high order bytes). The Modbus specification does not dictate which register should be high or low order so Watlow provides the user the ability to swap this order (Setup Page, Communications Menu) from the default low/high to high/low.

It should also be noted that some of the cells in the Modbus column contain wording pertaining to an offset. Several parameters in the control contain more than one instance; such as, alarms (24), analog inputs (16), etc... The Modbus register shown always represents instance one. Take for an example the Alarm Silencing parameter found in the Setup Page under the Alarm menu. Instance one is shown as address 2510 and +60 is identified as the offset to the next instance. If there was a desire to read or write to the same member instance 3, simply add 120 to 2510 to find its address; in this case, the instance 3 address for Alarm Silencing is 2630.

Note:

There are two columns shown in the menus that follow for communications protocols identified as CIP (Common Industrial Protocol) and Profibus. These columns will be useful if this control is used in conjunction with the RMA module or the EZ-ZONE Remote User Interface/Gateway (RUI/GTW) where those protocols can be selected as optional hardware. For this module (RMS), as a secondary protocol beyond Standard Bus, Modbus RTU can be ordered as optional hardware.

To learn more about the RUI/GTW point your browser to the link below and search for keyword EZ-ZONE. http://www.watlow.com/literature/pti_search.cfm

3

Chapter 3: Operations Pages

Scanner Module Operation Page Parameters

To navigate to the Operations Page using the RUI, follow the steps below:

1. From the Home Page, press both the Up and Down keys for three seconds. will appear in the upper display and will appear in the lower display.
2. Press the Up or Down key to view available menus.
3. Press the Advance Key to enter the menu of choice.
4. If a submenu exists (more than one instance), press the Up or Down key to select and then press the Advance Key to enter.
5. Press the Up or Down key to move through available menu prompts.
6. Press the Infinity Key to move backwards through the levels: parameter to submenu, submenu to menu, menu to Home Page.
7. Press and hold the Infinity Key for two seconds to return to the Home Page.

On the following pages, top level menus are identified with a yellow background color.

Note:

Some of these menus and parameters may not appear, depending on the controller's options. See model number information in the Appendix for more information. If there is only one instance of a menu, no submenus will appear.

Note:

Some of the listed parameters may not be visible. Parameter visibility is dependent upon controller part number.

Note:

Some values will be rounded off to fit in the four-character RUI display. Full values can be read with other interfaces. In firmware 9.0 and above, a user may specify ranges greater than may displayed by an RUI. If greater or less than an RUI can display, the display will show Value High or Value Low

	Sub	Source Value B	Input State
Analog Input Menu	SubC	Source Value C	
	SubD	Source Value D	Action Menu
Analog Input (1 to 16)	SubE	Source Value E	
Analog Input Value	OFST	Offset	Action (1 to 16)
Input Error	OUT	Output Value	Event Status
Calibration Offset			
	Digital Input/Output		Alarm Menu
Process Value Menu	MENU		
			Alarm (1 to 16)
Process Value (1 to 16)	Digital Input/Output		Low Set Point
Source Value A	(13 to 24)		High Set Point
	Output State		

<i>RCLR</i>	Clear Alarm *	<i>SuF</i>	Source Value F
<i>RSIR</i>	Silence Alarm *	<i>SuG</i>	Source Value G
<i>RSE</i>	Alarm State *	<i>SuH</i>	Source Value H
<i>Lnr</i>		<i>ou</i>	Output Value
<i>oPER</i>	Linearization Menu		
<i>I</i>			
<i>Lnr</i>	Linearization (1 to 24)		
<i>SuA</i>	Source Value A		
<i>OFSt</i>	Offset		
<i>ou</i>	Output Value		
<i>CPE</i>			
<i>oPER</i>	Compare Menu		
<i>I</i>			
<i>CPE</i>	Compare (1 to 24)		
<i>SuA</i>	Source Value A		
<i>Sub</i>	Source Value B		
<i>ou</i>	Output Value		
<i>ETTr</i>			
<i>oPER</i>	Timer Menu		
<i>I</i>			
<i>ETTr</i>	Timer (1 to 24)		
<i>SuA</i>	Source Value A		
<i>Sub</i>	Source Value B		
<i>Et</i>	Elapsed Time		
<i>ou</i>	Output Value		
<i>CTr</i>			
<i>oPER</i>	Counter Menu		
<i>I</i>			
<i>CTr</i>	Counter (1 to 24)		
<i>Cnt</i>	Count		
<i>SuA</i>	Source Value A		
<i>Sub</i>	Source Value B		
<i>ou</i>	Output Value		
<i>L9C</i>			
<i>oPER</i>	Logic Menu		
<i>I</i>			
<i>L9C</i>	Logic (1 to 24)		
<i>SuA</i>	Source Value A		
<i>Sub</i>	Source Value B		
<i>SuC</i>	Source Value C		
<i>SuD</i>	Source Value D		
<i>SuE</i>	Source Value E		

RM Scanner Module • Operations Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
R . oPER								
Analog Input Menu								
R.in Ain	Analog Input (1 to 16) Analog Input Value View the process value. Note: Ensure that the Error Status (below) indicates no error (61) when reading this value using a field bus protocol. If an error exists, the last known value prior to the error occurring will be returned.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	380 [offset 90]	0x68 (104) 1 to 16 1	0	4001	float R
No Display	Analog Input (1 to 16) Filtered Process Value View the process value when filtering is turned on.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	422 [offset 90]	0x68 (104) 1 to 16 0x16 (22)	-----	4022	float R
i.Er i.Er	Analog Input (1 to 16) Input Error View the cause of the most recent error. If the RtEn message is Er.1 to Er.19 or Er.10 to Er.16 , this parameter will display the cause of the input error.	none None (61) OPEN Open (65) Short Shorted (127) ERR Measurement Error (140) ECAL Bad Calibration Data (139) Er.Rb Ambient Error (9) Er.Ed RTD Error (141) FAIL Fail (32)	-----	382 [offset 90]	0x68 (104) 1 to 0x10 2	1	4002	uint R
i.CA i.CA	Analog Input (1 to 16) Calibration Offset Offset the input reading to compensate for lead wire resistance or other factors that cause the input reading to vary from the actual process value.	-1,999.000 to 9,999.000°F or units -1,110.555 to 5,555.000°C	0.0	402 [offset 90]	0x68 (104) 1 to 16 0xC (12)	2	4012	float RWES

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Operations Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
No Dis- play	Analog Input (1 to 16) Clear Error Clear latched input when input error con- dition no longer exists.	Clear Error (1221)	- - - -	436 [offset 90]	0x68 (104) 1 to 16 0x1D (29)	- - - -	4029	uint RW

*Pu
oPER*

Process Value Menu

<i>Su.A</i> Su.A	Process Value (1 to 16) Source Value A View the value of Source A.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	5210 [offset 70]	0x7E (126) 1 to 16 0x10 (16)	- - - -	26016	float R
<i>Sub</i> Sub.b	Process Value (1 to 16) Source Value B View the value of Source B.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	5212 [offset 70]	0x7E (126) 1 to 16 0x11 (17)	- - - -	26017	float R
<i>Su.C</i> Su.C	Process Value (1 to 16) Source Value C View the value of Source C.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	5214 [offset 70]	0x7E (126) 1 to 16 0x12 (18)	- - - -	26018	float R
<i>Su.d</i> Su.d	Process Value (1 to 16) Source Value D View the value of Source D.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	5216 [offset 70]	0x7E (126) 1 to 16 0x13 (19)	- - - -	26019	float R
<i>Su.E</i> Su.E	Process Value (1 to 16) Source Value E View the value of Source E.	<i>OFF</i> Off (62) <i>ON</i> On (63)	- - - -	5218 [offset 70]	0x7E (126) 1 to 16 0x14 (20)	- - - -	26020	float R
<i>oFSt</i> oFSt	Process Value (1 to 16) Offset Set an offset to be applied to this function's output.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	0	5224 [offset 70]	0x7E (126) 1 to 16 0x17 (23)	- - - -	26023	float RWES
<i>o.u</i> o.u	Process Value (1 to 16) Output Value View the value of this function block's out- put.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	5222 [offset 70]	0x7E (126) 1 to 16 0x16 (22)	- - - -	26022	float R

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Operations Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
No Dis-play	Process Value (1 to 16) Error View reported cause for Process output malfunction.	None (61) Open (65) Shorted (127) Measurement error (140) Bad calibration data (139) Ambient error (9) RTD error (14) Fail (32) Math error (1423) Not sourced (246) Stale (1617)	- - - -	5232 [offset 70]	0x7E (126) 1 to 16 0x1B (27)	- - - -	26027	uint R
d io oPEr								
Digital Input/Output Menu								
do.S	Digital Output (1 to 12) Output State View the state of this output.	oFF Off (62) on On (63)	- - - -	1832 [offset 30]	0x6A (106) 1 to 12 7	46	6007	uint R
di.S	Digital Input (1 to 12) Input State View this event input state.	oFF Off (62) on On (63)	- - - -	1840 [offset 30]	0x6A (106) 1 to 12 0x0B (11)	- - - -	6011	uint R
No Dis-play	Digital Input (1 to 12) Source Error View reported cause for input malfunction.	None (61) Open (65) Shorted (127) Measurement error (140) Bad calibration data (139) Ambient error (9) RTD error (14) Fail (32) Math error (1423) Not sourced (246) Stale (1617)	- - - -	1848 [offset 30]	0x6A (106) 1 to 12 0x0F (15)	- - - -	6015	uint R
ACT oPEr								
Action Menu								
E i.S	Action (1 to 16) Event Status View this input state.	oFF Off (62) on On (63)	- - - -	2188 [offset 20]	0x6E (110) 1 to 16 5	81	10005	uint R
** R: Read, W: Write, E: EEPROM, S: User Set								

RM Scanner Module • Operations Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
No Display	Function Key (1) Function Key State View current state of function key 1.	Off (62) On (63)	-----	-----	-----	-----	3024	uint R
No Display	Function Key (2) Function Key State View current state of function key 2.	Off (62) On (63)	-----	-----	-----	-----	3030	uint R

ALP7

oPER

Alarm Menu

ALo A.Lo	Alarm (1 to 16) Low Set Point If Type (Setup Page, Alarm Menu) is set to: Process - set the process value that will trigger a low alarm.	-1,999.000 to 9,999.000 °F or units -1,128.000 to 5,537.000 °C	32.0 °F or units 0.0 °C	2502 [offset 60]	0x6D (109) 1 to 16 2	18	9002	float RWES
A.hi A.hi	Alarm (1 to 16) High Set Point If Type (Setup Page, Alarm Menu) is set to: Process - set the process value that will trigger a high alarm.	-1,999.000 to 9,999.000 °F or units -1,128.000 to 5,537.000 °C	300.0 °F or units 150.0 °C	2500 [offset 60]	0x6D (109) 1 to 16 1	19	9001	float RWES
ACLR A.CLR	Alarm (1 to 16) Clear Alarm Write to this register to clear an alarm	0	-----	-----	-----	-----	9026	uint W
ASir A.Sir	Alarm (1 to 16) Silence Alarm Write to this register to silence an alarm	0	-----	-----	-----	-----	9027	uint W
ASt A.St	Alarm (1 to 16) Alarm State Current state of alarm	St Startup (88) none None (61) bl Blocked (12) ALL Alarm Low (8) ALH Alarm High (7) ALE Error (28)	-----	2516 [offset 60]	0x6D (109) 1 to 16 9	-----	9010	uint R
No Display	Alarm (1 to 16) Alarm Clearable Read to see if alarm can be cleared.	No (59) Yes (106)	-----	2522 [offset 60]	0x6D (109) 1 to 16 0xC (12)	-----	9012	uint R

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RM Scanner Module • Operations Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
No Dis-play	Alarm (1 to 16) Silenced Read to see if alarm is active but has been silenced by Silence Alarm.	Yes (106) No (59)	- - - -	2520 [offset 60]	0x6D (109) 1 to 16 0x0B (11)	- - - -	9011	uint R
No Dis-play	Alarm (1 to 16) Latched Read to see if alarm is currently latched.	Yes (106) No (59)	- - - -	2518 [offset 60]	0x6D (109) 1 to 16 0x0A (10)	- - - -	9010	uint R
No Dis-play	Alarm (1 to 16) Clear Request Write to this register to clear an alarm	Clear (0) No Change (255)	None	2524 [offset 60]	0x6D (109) 1 to 16 0xD (13)	32	9013	uint RW
No Dis-play	Alarm (1 to 16) Silence Request Write to this register to silence an alarm	Clear (0) No Change (255)	None	2526 [offset 60]	0x6D (109) 1 to 16 0x0E (14)	33	9014	uint RW
No Dis-play	Alarm (1 to 16) Alarm Working Process Value Read process value used by alarms	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	None	2536 [offset 60]	0x6D (109) 1 to 16 0x13 (19)	- - - -	9019	float R
No Dis-play	Alarm (1 to 16) Alarm Working Set Point Read set point used by alarms	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	None	2538 [offset 60]	0x6D (109) 1 to 16 0x14 (20)	- - - -	9020	float R
No Dis-play	Alarm (1 to 16) Output Value Read state of alarm output	On (63) Off (62)	None	2546 [offset 60]	0x6D (109) 1 to 16 0x18 (24)	- - - -	9024	uint R
<i>Lnr oPER</i> Linearization Menu								
<i>5uA</i> Su.A	Linearization (1 to 24) Source Value A View the value of Source A.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	11346 [offset 70]	0x86 (134) 1 to 24 4	- - - -	34004	float R
<i>oFSt</i> oFSt	Linearization (1 to 24) Offset Set an offset to be applied to this function's output.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	0	11350 [offset 70]	0x86 (134) 1 to 24 6	- - - -	34006	float RWES

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Operations Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
a.u o.v	Linearization (1 to 24) Output Value View the value of this function's output.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	11352 [offset 70]	0x86 (134) 1 to 24 7	-----	34007	float R
No Display	Linearization (1 to 24) Error View reported cause for Linearization output malfunction.	None (61) Open (65) Shorted (127) Measurement error (140) Bad calibration data (139) Ambient error (9) RTD error (14) Fail (32) Math error (1423) Not sourced (246) Stale (1617) Can't process (1659)	-----	11394 [offset 70]	0x86 (134) 1 to 24 0x1C (28)	-----	34028	uint R
CPE oPER								
Compare Menu								
Su.A	Compare (1 to 24) Source Value A View the value of Source A.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	8232 [offset 40]	0x80 (128) 1 to 24 7	-----	28007	float R
Su.b	Compare (1 to 24) Source Value B View the value of Source B.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	8234 [offset 40]	0x80 (128) 1 to 24 8	-----	28008	float R
a.u o.v	Compare (1 to 24) Output Value View the value of this function's output.	OFF Off (62) ON On (63)	-----	8238 [offset 40]	0x80 (128) 1 to 24 0xA (10)	-----	28010	uint R

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Operations Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
No Display	Compare (1 to 24) Error Read reported cause for compare error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)	- - - -	8244 [offset 40]	0x80 (128) 1 to 24 0x0D (13)	- - - -	28013	uint R
Timer oPEr Timer Menu								
Su.A Su.A	Timer (1 to 24) Source Value A View the value of Source A.	oFF Off (62) on On (63)	- - - -	10152 [offset 50]	0x83 (131) 1 to 24 7	- - - -	31007	uint R
Sub Su.b	Timer (1 to 24) Source Value B View the value of Source B.	oFF Off (62) on On (63)	- - - -	10154 [offset 50]	0x83 (131) 1 to 24 8	- - - -	31008	uint R
E.t E.t	Timer (1 to 24) Elapsed Time View the value of this function's elapsed time.	0 to 9,999.000 seconds	- - - -	10170 [offset 50]	0x83 (131) 1 to 24 0x10 (16)	- - - -	31016	float R
o.v o.v	Timer (1 to 24) Output Value View the value of this function's output.	oFF Off (62) on On (63)	- - - -	10158 [offset 50]	0x83 (131) 1 to 24 0x11 (17)	- - - -	31010	uint R
No Display	Timer (1 to 24) Running Read to determine if timer is running	Off (62) On (63)	- - - -	10168 [offset 50]	0x83 (131) 1 to 24 0x0F (15)	- - - -	31015	uint R
No Display	Timer (1 to 24) Error Read reported cause for timer error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)	- - - -	10174 [offset 50]	0x83 (131) 1 to 24 0x12 (18)	- - - -	31018	uint R

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RM Scanner Module • Operations Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
Ctr oPEr								
Counter Menu								
Cnt Cnt	Counter (1 to 24) Count View the function's total count.	0 to 9,999	- - - -	9208 [offset 40]	0x82 (130) 1 to 24 0xF (15)	217	30015	uint R
Su.A Su.A	Counter (1 to 24) Source Value A View the value of Source A.	OFF Off (62) on On (63)	- - - -	9192 [offset 40]	0x82 (130) 1 to 24 7	- - - -	30007	uint R
Su.b Su.b	Counter (1 to 24) Source Value B View the value of Source B.	OFF Off (62) on On (63)	- - - -	9194 [offset 40]	0x82 (130) 1 to 24 8	- - - -	30008	uint R
o.v o.v	Counter (1 to 24) Output Value View the value of this function's output.	OFF Off (62) on On (63)	- - - -	9198 [offset 40]	0x82 (130) 1 to 24 0xA (10)	- - - -	30010	uint R
No Dis- play	Counter (1 to 24) Error Read reported cause for counter error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)	- - - -	9210 [offset 40]	0x82 (130) 1 to 24 0x10 (16)	- - - -	30016	uint R
LgC oPEr								
Logic Menu								
Su.A Su.A	Logic (1 to 24) Source Value A View the value of Source A.	OFF Off (62) on On (63)	- - - -	6348 [offset 80]	0x7F (127) 1 to 24 0x19 (25)	- - - -	27025	uint R
Su.b Su.b	Logic (1 to 24) Source Value B View the value of Source B.	OFF Off (62) on On (63)	- - - -	6350 [offset 80]	0x7F (127) 1 to 24 0x1A (26)	- - - -	27026	uint R

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RM Scanner Module • Operations Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
<i>Su.C</i> Su.C	Logic (1 to 24) Source Value C View the value of Source C.	<i>OFF</i> Off (62) <i>on</i> On (63)	- - - -	6352 [offset 80]	0x7F (127) 1 to 24 0x1B (27)	- - - -	27027	uint R
<i>Su.d</i> Su.d	Logic (1 to 24) Source Value D View the value of Source D.	<i>OFF</i> Off (62) <i>on</i> On (63)	- - - -	6354 [offset 80]	0x7F (127) 1 to 24 0x1C (28)	- - - -	27028	uint R
<i>Su.E</i> Su.E	Logic (1 to 24) Source Value E View the value of Source E.	<i>OFF</i> Off (62) <i>on</i> On (63)	- - - -	6356 [offset 80]	0x7F (127) 1 to 24 0x1D (29)	- - - -	27029	uint R
<i>Su.F</i> Su.F	Logic (1 to 24) Source Value F View the value of Source F.	<i>OFF</i> Off (62) <i>on</i> On (63)	- - - -	6358 [offset 80]	0x7F (127) 1 to 24 0x1E (30)	- - - -	27030	uint R
<i>Su.g</i> Su.g	Logic (1 to 24) Source Value G View the value of Source G.	<i>OFF</i> Off (62) <i>on</i> On (63)	- - - -	6360 [offset 80]	0x7F (127) 1 to 24 0x1F (31)	- - - -	27031	uint R
<i>Su.h</i> Su.h	Logic (1 to 24) Source Value H View the value of Source H.	<i>OFF</i> Off (62) <i>on</i> On (63)	- - - -	6362 [offset 80]	0x7F (127) 1 to 24 0x20 (32)	- - - -	27032	uint R
<i>o.v</i> o.v	Logic (1 to 24) Output Value View the value of this function's output.	<i>OFF</i> Off (62) <i>on</i> On (63)	- - - -	6366 [offset 80]	7F (127) 1 to 24 0x22 (34)	- - - -	27034	uint R
No Dis- play	Logic (1 to 24) Error Read reported cause for logic error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)	- - - -	6370 [offset 80]	0x7F (127) 1 to 24 0x24 (36)	- - - -	27036	uint R

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RM Scanner Module • Operations Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
<i>Math</i> <i>oPer</i> Math Menu								
<i>Su.A</i> Su.A	Math (1 to 24) Source Value A View the value of Source A.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	3530 [offset 70]	0x7D (125) 1 to 24 0x10 (16)	-----	25016	float R
<i>Su.b</i> Su.b	Math (1 to 24) Source Value B View the value of Source B.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	3532 [offset 70]	0x7D (125) 1 to 24 0x11 (17)	-----	25017	float R
<i>Su.C</i> Su.C	Math (1 to 24) Source Value C View the value of Source C.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	3534 [offset 70]	0x7D (125) 1 to 24 0x12 (18)	-----	25018	float R
<i>Su.d</i> Su.d	Math (1 to 24) Source Value D View the value of Source D.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	3536 [offset 70]	0x7D (125) 1 to 24 0x13 (19)	-----	25019	float R
<i>Su.E</i> Su.E	Math (1 to 24) Source Value E View the value of Source E.	<i>oFF</i> Off (62) <i>on</i> On (63)	-----	3538 [offset 70]	0x7D (125) 1 to 24 0x14 (20)	-----	25020	uint R
<i>oFSt</i> oFSt	Math (1 to 24) Offset Set an offset to be applied to this function's output.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	0	3544 [offset 70]	0x7D (125) 1 to 24 0x17 (23)	-----	25023	float RWES
<i>o.v</i> o.v	Math (1 to 24) Output Value View the value of this function's output.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-----	3542 [offset 70]	0x7D (125) 1 to 24 0x16 (22)	-----	25022	float R
** R: Read, W: Write, E: EEPROM, S: User Set								

RM Scanner Module • Operations Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
No Dis-play	Math (1 to 24) Error Read reported cause for logic error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)	- - - -	3556 [offset 70]	0x7D (125) 1 to 24 0x1D (29)	- - - -	25029	uint R

** R: Read, W: Write, E: EEPROM, S: User Set

4

Chapter 4: Setup Pages

RMS Module Setup Page Parameters

To navigate to the Setup Page using the RUI, follow the steps below:

1. From the Home Page, press and hold both the Up and Down keys for six seconds. will appear in the upper display and will appear in the lower display.

Note:

If keys are released when is displayed, press the Infinity Key or reset key to exit and repeat until is displayed.

2. Press the Up or Down key to view available menus.
3. Press the Advance Key to enter the menu of choice.
4. If a submenu exists (more than one instance), press the Up or Down key to select and then press the Advance Key to enter.
5. Press the Up or Down key to move through available menu prompts.
6. Press the Infinity Key to move backwards through the levels: parameter to submenu, submenu to menu, menu to Home Page.
7. Press and hold the Infinity Key for two seconds to return to the Home Page.

On the following pages, top level menus are identified with a yellow background color.

Note:

Some of these menus and parameters may not appear, depending on the controller's options. See model number information in the Appendix for more information. If there is only one instance of a menu, no submenus will appear.

Note:

Some of the listed parameters may not be visible. Parameter visibility is dependent upon controller part number.

Note:

Some values will be rounded off to fit in the four-character RUI display. Full values can be read with other interfaces. In firmware 9.0 and above, a user may specify ranges greater than may be displayed by an RUI. If greater or less than an RUI can display, the display will show Value High or Value Low .

		Range High		Custom Coefficient
Analog Input Menu		Process Error Enable		C
		Process Error Low Value		Filter
Analog Input (1 to 16)		Thermistor Curve		Input Error Latching
Sensor Type		Resistance Range		Display Precision
TC Linearization		Custom Coefficient A		Calibration Offset
Units		Custom Coefficient B		Analog Input Value *
Scale Low				Input Error *
Scale High				
Range Low				

P_u	
SET Process Value	
I	
P_u Process Value (1 to 16)	
F_n	Function
SF_{nA}	Source Function A
S_{iA}	Source Instance A
SFn_b	Source Function B
S_{iB}	Source Instance B
S2_b	Source Zone B
SFn_C	Source Function C
S_{iC}	Source Instance C
S2_C	Source Zone C
SFn_D	Source Function D
S_{iD}	Source Instance D
S2_D	Source Zone D
SFn_E	Source Function E
S_{iE}	Source Instance E
S2_E	Source Zone E
C.P	Cross Over Point
C.b	Cross Over Band
P.un_t	Pressure Units
A.un_t	Altitude Units
bPr	Barometric Pressure
F_{IL}	Filter

d_{IO}	
SET Digital Input/Output Menu	
I	

d_{IO} Digital Input/Output (13 to 24)	
d_{ir}	Direction
F_n	Function
F_i	Output Function Instance
S2_A	Output Source Zone
aCt	Time Base Type
atb	Fixed Time Base
aLo	Low Power Scale
ah_i	High Power Scale

ACT	
SET Action Menu	
I	
ACT Action (1 to 16)	
F_n	Action Function
F_i	Function Instance

SFnA	Source Function A
S_{iA}	Source Instance A
S2_A	Source Zone A
LE_u	Active Level

oEPt	
SET Output Menu	
I	
oEPt	Output (1 to 4, 7 to 10)
F_n	Function
F_i	Output Function Instance
S2	Output Source Zone
aCt	Time Base Type
atb	Fixed Time Base
aLo	Low Power Scale
ah_i	High Power Scale
oEPt	Output (1 to 3, 7 to 9) process
oEY	Output Type
F_n	Function
F_i	Output Function Instance
S2_A	Source Zone A
SLo	Scale Low
sh_i	Scale High
rLo	Range Low
rh_i	Range High
oER	Calibration Offset

ALPn	
SET Alarm Menu	
I	
ALPn	Alarm (1 to 16)
AEY	Type
S_{rA}	Alarm Source
ISR	Alarm Source Instance
S2_A	Alarm Source Zone
Rhy	Hysteresis
RLg	Logic
RSd	Sides
RLo	Low Set Point *
Rh_i	High Set Point *
RLA	Latching
RBL	Blocking
RS_i	Silencing
RdSP	Display
RdL	Delay Time

ACLR	Clear Alarm *
RS_ir	Silence Alarm *
RSE	Alarm State *

Lnr	
SET Linearization Menu	

I	
Lnr	Linearization (1 to 24)
F_n	Function
SF_{nA}	Source Function A
S_{iA}	Source Instance A
S2_A	Source Zone A
Un_{iE}	Units
IP₁	Input Point 1
OP₁	Output Point 1
IP₂	Input Point 2
OP₂	Output Point 2
IP₃	Input Point 3
OP₃	Output Point 3
IP₄	Input Point 4
OP₄	Output Point 4
IP₅	Input Point 5
OP₅	Output Point 5
IP₆	Input Point 6
OP₆	Output Point 6
IP₇	Input Point 7
OP₇	Output Point 7
IP₈	Input Point 8
OP₈	Output Point 8
IP₉	Input Point 9
OP₉	Output Point 9
IP₁₀	Input Point 10
OP₁₀	Output Point 10

CPE	
SET Compare Menu	
I	
CPE	Compare (1 to 24)
F_n	Function
tol	Tolerance
SFnA	Source Function A
S_{iA}	Source Instance A
S2_A	Source Zone A
SFn_b	Source Function B
S_{iB}	Source Instance B
S2_B	Source Zone B
Er_h	Error Handling

EPT_r

SET Timer Menu

1

EPT_r Timer (1 to 24)

F_n Function

SFnA Source Function A

S_iA Source Instance A

S2A Source Zone A

SAS_A Run Active Level

SFnB Source Function B

S_iB Source Instance B

S2B Source Zone B

SAS_B Reset Active Level

T_e Time

LE_a Transmitter Active Level

ET_r

SET Counter Menu

1

ET_r Counter (1 to 24)

F_n Function

SFnA Source Function A

S_iA Source Instance A

S2A Source Zone A

SAS_A Count Active Level

SFnB Source Function B

S_iB Source Instance B

S2B Source Zone B

SAS_B Reset Active Level

LoRd Load Value

Trg_t Target Value

LAT Latching

L9C

SET Logic Menu

1

L9C Logic (1 to 24)

F_n Function

SFnA Source Function A

S_iA Source Instance A

S2A Source Zone A

SFnB Source Function B

S_iB Source Instance B

S2B Source Zone B

SFnC Source Function C

S_iC Source Instance C

S2C Source Zone C

SFnD Source Function D

S_iD Source Instance D

S2D Source Zone D

SFnE Source Function E

S_iE Source Instance E

S2E Source Zone E

SFnF Source Function F

S_iF Source Instance F

S2F Source Zone F

SFnG Source Function G

S_iG Source Instance G

S2G Source Zone G

SFnH Source Function H

S_iH Source Instance H

S2H Source Zone H

Er_h Error Handling

d₁₉ Digital

AnL9 Analog

9LBL

SET Global Menu

9LBL Global

C_F Display Units

ACLF AC Line Frequency

PNRH Maximum

PNin Minimum

dPrS Display Pairs

USR.S Save Settings As

USRr Restore Settings From

COP_r

SET Communications Menu

COP_r Communications

bAUD Baud Rate

PR_r Parity

PNHL Modbus Word Order

C_F Display Units

nVS Non-volatile Save

P7AE

SET Math Menu

1

P7AE Math (1 to 24)

F_n Function

SFnA Source Function A

S_iA Source Instance A

S2A Source Zone A

SFnB Source Function B

S_iB Source Instance B

S2B Source Zone B

SFnC Source Function C

S_iC Source Instance C

S2C Source Zone C

SFnD Source Function D

S_iD Source Instance D

S2D Source Zone D

SFnE Source Function E

S_iE Source Instance E

S2E Source Zone E

SLo Scale Low

Sh₁ Scale High

Un_{1t} Units

rLo Range Low

rhi Range High

Punt Pressure Units

Runt Altitude Units

F_{1L} Filter

uR_r

SET Variable Menu

1

uR_r Variable (1 to 24)

TYPE Data Type

Un_{1t} Units

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **	
R , SET									
Analog Input Menu									
SEn SEn	Analog Input (1 to 16) Sensor Type Set the analog sensor type to match the device wired to this input. Note: There is no open sensor protection for process inputs.	oFF Off (62) Tc Thermocouple (95) MV Millivolts (56) Vdc Volts dc (104) MA Millamps dc (112) RTD100 RTD 100 Ω (113) RTD1000 RTD 1,000 Ω (114) Pot Potentiometer 1 kΩ (155) ThEr Thermistor (229)		Thermo-couple or Thermistor	388 [offset 90]	0x68 (104) 1 to 16 5	3	4005	uint RWES
Lin Lin	Analog Input (1 to 16) TC Linearization Set the linearization to match the thermocouple wired to this input.	b B (11) H K (48) c C (15) n N (58) d D (23) r R (80) e E (26) s S (84) f F (30) t T (93) j J (46)	J	390 [offset 90]	0x68 (104) 1 to 16 6	4	4006	uint RWES	
Unit Unit	Analog Input (1 to 16) Units Set the type of units the sensor will measure.	AEP Absolute Temperature (1540) rh Relative Humidity (1538) Pr Process (75) Pwr Power (73)	Process	462 [offset 90]	0x68 (104) 1 to 16 0x2A (42)	5	4042	uint RWES	
SLo S.Lo	Analog Input (1 to 16) Scale Low Set the low scale for process inputs. This value, in millivolts, volts or millamps, will correspond to the Range Low output of this function block.	-100.0 to 1,000.0	0.0	408 [offset 90]	0x68 (104) 1 to 16 0xF (15)	6	4015	float RWES	

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>S.hi</i>	Analog Input (1 to 16) Scale High Set the high scale for process inputs. This value, in millivolts, volts or milliamperes, will correspond to the Range High output of this function block.	-100.0 to 1,000.0	20.0	410 [offset 90]	0x68 (104) 1 to 16 0x10 (16)	7	4016	float RWES
<i>r.lo</i>	Analog Input (1 to 16) Range Low Set the low range for this function block's output.	-1,999.000 to 9,999.000	0.0	412 [offset 90]	0x68 (104) 1 to 16 0x11 (17)	8	4017	float RWES
<i>r.hi</i>	Analog Input (1 to 16) Range High Set the high range for this function block's output.	-1,999.000 to 9,999.000	9,999	414 [offset 90]	0x68 (104) 1 to 16 0x12 (18)	9	4018	float RWES
<i>P.EE</i>	Analog Input (1 to 16) Process Error Enable Turn the Process Error Low feature on or off.	<i>oFF</i> Off (62) <i>LoW</i> Low (53)	Off	438 [offset 90]	0x68 (104) 1 to 16 0x1E (30)	10	4030	uint RWES
<i>P.EL</i>	Analog Input (1 to 16) Process Error Low Value If the process value drops below this value, it will trigger an input error.	-100.0 to 1,000.0	0.0	440 [offset 90]	0x68 (104) 1 to 16 0x1F (31)	11	4031	float RWES
<i>t.C</i>	Analog Input (1 to 16) Thermistor Curve Select a curve to apply to the thermistor input.	<i>A</i> Curve A (1451) <i>B</i> Curve B (1452) <i>C</i> Curve C (1453) <i>CUSt</i> Custom (180)	Curve A	454 [offset 90]	0x68 (104) 1 to 16 0x26 (38)	-----	4038	uint RWES

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>r.r</i> r.r	<i>Analog Input (1 to 16)</i> Resistance Range Set the maximum resistance of the thermistor input.	5 5K (1448) 10 10K (1360) 20 20K (1361) 40 40K (1449)	40K	452 [offset 90]	0x68 (104) 1 to 16 0x25 (37)	- - -	4037	uint RWES
<i>Co.A</i> Co.A	<i>Analog Input (1 to 16)</i> Custom Coefficient A Enter custom Thermistor coefficients.	-3.4e38 to 3.4e38	0	- - -	- - -	- - -	4039	float RWES
<i>Co.b</i> Co.b	<i>Analog Input (1 to 16)</i> Custom Coefficient B Enter custom Thermistor coefficients.	-3.4e38 to 3.4e38	0	- - -	- - -	- - -	4040	float RWES
<i>Co.C</i> Co.C	<i>Analog Input (1 to 16)</i> Custom Coefficient C Enter custom Thermistor coefficients.	-3.4e38 to 3.4e38	0	- - -	- - -	- - -	4041	float RWES
<i>FiL</i> FiL	<i>Analog Input (1 to 16)</i> Filter Filtering smooths out the process signal to both the display and the input. Increase the time to increase filtering.	0.0 to 60.0 seconds	0.5	406 [offset 90]	0x68 (104) 1 to 16 0xE (14)	12	4014	float RWES
<i>i.Er</i> i.Er	<i>Analog Input (1 to 16)</i> Input Error Latching Turn input error latching on or off. If latching is on, errors must be manually cleared.	<i>OFF</i> Off (62) <i>On</i> On (63)	Off	434 [offset 90]	0x68 (104) 1 to 16 0x1C (28)	- - -	4028	uint RWES
<i>dEC</i> dEC	<i>Analog Input (1 to 16)</i> Display Precision Set the precision of the displayed value.	0 Whole (105) 0.0 Tenths (94) 0.00 Hundredths (40) 0.000 Thousandths (96)	Whole	418 [offset 90]	0x68 (104) 1 to 16 0x14 (20)	- - -	4020	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
i.CA	Analog Input (1 to 16) Calibration Offset * Offset the input reading to compensate for lead wire resistance or other factors that cause the input reading to vary from the actual process value.	-1,999.000 to 9,999.000 °F or units -1,110.555 to 5,555.000 °C	0.0	402 [offset 90]	0x68 (104) 1 to 16 0xC (12)	2	4012	float RWES
Ain	Analog Input (1 to 16) Analog Input Value * View the process value. Note: Ensure that the Error Status (below) indicates no error (61) when reading this value using a field bus protocol. If an error exists, the last known value prior to the error occurring will be returned.	-1,999.000 to 9,999.000 °F or units -1,128.000 to 5,537.000 °C	- - - -	380 [offset 90]	0x68 (104) 1 to 16 1	0	4001	float R
i.Er	Analog Input (1 to 16) Input Error * View the cause of the most recent error.	<i>None</i> None (61) <i>OPEn</i> Open (65) <i>Shrt</i> Shorted (127) <i>E.M</i> Measurement Error (140) <i>E.CRL</i> Bad Calibration Data (139) <i>Er.Rb</i> Ambient Error (9) <i>Er.Ed</i> RTD Error (141) <i>FR.L</i> Fail (32)	- - - -	382 [offset 90]	0x68 (104) 1 to 16 2	1	4002	uint R

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
Pu SET								
Process Value Menu								
<i>Fn</i>	Fn Function Set the function that will be applied to the source or sources.	<i>oFF</i> Off (62) <i>SbR</i> Sensor Backup (1201) <i>Avg</i> Average (1367) <i>Crossover</i> (1368) <i>WBD</i> Wet Bulb Dry Bulb (1369) <i>SO</i> Switch Over (1370) <i>DIF</i> Differential (1373) <i>RAT</i> , Ratio (1374) <i>Add</i> Add (1375) <i>MUL</i> Multiply (1376) <i>ADF</i> Absolute Difference (1377) <i>MIN</i> Minimum (1378) <i>MAX</i> Maximum (1379) <i>SQRT</i> Square Root (1380) <i>VSLA</i> Vaisala (1648) <i>PLT</i> Pressure to Altitude (1649)	Off	5220 [offset 70]	0x7E (126) 1 to 16 0x15 (21)	123	26021	uint RWES
<i>SFn.A</i>	SFn.A Source Function A Set the type of function that will be used for this source.	<i>none</i> None (61) <i>AI</i> Analog Input (142) <i>Lnr</i> Linearization (238) <i>MATH</i> Math (240) <i>Pu</i> Process Value (241) <i>Var</i> Variable (245)	Analog Input	5180 [offset 70]	0x7E (126) 1 to 16 1	- - -	26001	uint RWES
<i>Si.A</i>	Si.A Source Instance A Set the instance of the function selected above.	1 to 250		5190 [offset 70]	0x7E (126) 1 to 16 6	- - -	26006	uint RWES
<i>SFn.b</i>	SFn.b Source Function B Set the type of function that will be used for this source.	<i>none</i> None (61) <i>AI</i> Analog Input, (142) <i>Lnr</i> Linearization (238) <i>MATH</i> Math (240) <i>Pu</i> Process Value (241) <i>Var</i> Variable (245)	None	5182 [offset 70]	0x7E (126) 1 to 16 2	- - -	26002	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
S_i.b Si.b	Process Value (1 to 16) Source Instance B Set the instance of the function selected above.	1 to 250	1	5192 [offset 70]	0x7E (126) 1 to 16 7	- - - -	26007	uint RWES
S_Z.b SZ.b	Process Value (1 to 16) Source Zone B Set the zone of the function selected above.	0 to 24	0	5202 [offset 70]	0x7E (126) 1 to 16 0xC(12)	- - - -	26012	uint RWES
S_{Fn}.C SFn.C	Process Value (1 to 16) Source Function C Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>R</i> , Analog Input (142) <i>Lnr</i> Linearization (238) <i>MATH</i> Math (240) <i>Pu</i> Process Value (241) <i>uAr</i> Variable (245)	None	5184 [offset 70]	0x7E (126) 1 to 16 3	- - - -	26003	uint RWES
S_i.C Si.C	Process Value (1 to 16) Source Instance C Set the instance of the function selected above.	1 to 250	1	5194 [offset 70]	0x7E (126) 1 to 16 8	- - - -	26008	uint RWES
S_Z.C SZ.C	Process Value (1 to 16) Source Zone C Set the zone of the function selected above.	0 to 24	0	5204 [offset 70]	0x7E (126) 1 to 16 0x0D (13)	- - - -	26013	uint RWES
S_{Fn}.d SFn.d	Process Value (1 to 16) Source Function D Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>R</i> , Analog Input, (142) <i>Lnr</i> Linearization (238) <i>MATH</i> Math (240) <i>Pu</i> Process Value (241) <i>uAr</i> Variable (245)	None	5186 [offset 70]	0x7E (126) 1 to 16 4	- - - -	26004	uint RWES
S_i.d Si.d	Process Value (1 to 16) Source Instance D Set the instance of the function selected above.	1 to 250	1	5196 [offset 70]	0x7E (126) 1 to 16 9	- - - -	26009	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SZ.d	Process Value (1 to 16) Source Zone D Set the zone of the function selected above.	0 to 24	0	5206 [offset 60]	0x7E (126) 1 to 16 0x0E (14)	- - - -	26014	uint RWES
SFn.E	Process Value (1 to 16) Source Function E Set the type of function that will be used by this source to trigger a switch between Source A and Source B.	<i>nonE</i> None (61) <i>ALM</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>dIO</i> Digital I/O (1142) <i>EnbA</i> Profile Event Out A (233) <i>EnbB</i> Profile Event Out B (234) <i>EnbC</i> Profile Event Out C (235) <i>EnbD</i> Profile Event Out D (236) <i>EnbE</i> Profile Event Out E (247) <i>EnbF</i> Profile Event Out F (248) <i>EnbG</i> Profile Event Out G (249) <i>EnbH</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L9C</i> Logic (239) <i>TMR</i> Timer (244) <i>Var</i> Variable (245)	None	5188 [offset 70]	0x7E (126) 1 to 16 5	- - - -	26005	uint RWES
Si.E	Process Value (1 to 16) Source Instance E Set the instance of the function selected above.	1 to 250	1	5198 [offset 70]	0x7E (126) 1 to 16 0xA (10)	- - - -	26010	uint RWES
SZ.E	Process Value (1 to 16) Source Zone E Set the zone of the function selected above.	0 to 24	0	5208 [offset 70]	0x7E (126) 1 to 16 0xF (15)	- - - -	26015	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>C.P</i> C.P	Process Value (1 to 16) Cross Over Point When the value of source A is <= cross over point - crossover band divided by 2 then the output value will use source A.	-1999.000 to 9999.000	100.0	5226 [offset 70]	0x7E (126) 1 to 16 0x18 (24)		26024	float RWES
<i>C.b</i> C.b	Process Value (1 to 16) Cross Over Band The source will transition between Source A and Source B when within this band at a progressive rate	-1999.000 to 9999.000	10.0	5228 [offset 70]	0x7E (126) 1 to 16 0x19 (25)		26025	float RWES
<i>P.unt</i> P.unt	Process Value (1 - 16) Pressure Units If Process Value function is set for Pressure to Altitude units, define units of measure for conversion.	<i>PS</i> , Pounds per Square Inch (1671) <i>PASC</i> Pascal (1674) <i>ATM</i> Atmosphere (1675) <i>MBR</i> Millibar (1672) <i>Torr</i> Torr (1673)	PSI	5234 [offset 70]	0x7E (126) 1 to 16 0x1C (28)	- - - -	26028	uint RWES
<i>A.unt</i> A.unt	Process Value (1 - 16) Altitude Units If Process Value function is set for Pressure to Altitude units, define units of measure for conversion.	<i>HFT</i> Kilofeet (1677) <i>FT</i> Feet (1676)	Hft	5236 [offset 70]	0x7E (126) 1 to 16 0x1D (29)	- - - -	26029	uint RWES
<i>b.Pr</i> b.Pr	Process Value (1 - 16) Barometric Pressure If Process Value function is set for Wet Bulb / Dry Bulb, define pressure value used for humidity calculation.	10.0 to 16.0	14.7	5238 [offset 70]	0x7E (126) 1 to 16 0x1E (30)	- - - -	26030	float RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>F_iL</i> FiL	<i>Process Value (1 to 16)</i> Filter Filtering smooths out the output signal of this function block. Increase the time to increase filtering.	0.0 to 60.0 seconds	0.0	5230 [offset 70]	0x7E (126) 1 to 16 0x1A (26)	- - -	26026	float RWES
<i>d io</i> <i>SET</i>								
Digital Input/Output Menu								
<i>d ir</i> dir	<i>Digital Input/Output (13 to 24)</i> Direction Set this function to operate as an input or output.	<i>DEPE</i> Output (68) <i>in</i> Input Voltage (193) <i>lCon</i> Input Dry Contact (44)	Output	1820 [offset 30]	0x6A (106) 13 to 24 1	38	6001	uint RWES
* These parameters/prompts are available in these menus with firmware revisions 6.0 and above. ** R: Read, W: Write, E: EEPROM, S: User Set								

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>Fn</i> Fn	Digital Output (13 to 24) Function Select what function will drive this output.	<i>oFF</i> Off (62) <i>R</i> , Analog Input (142) <i>ALRM</i> Alarm (6) <i>CP</i> Cool Power, Control Loop (161) <i>HP</i> Heat Power, Control Loop (160) <i>CPE</i> Compare (230) <i>CT</i> Counter (231) <i>DI</i> Digital I/O (1142) <i>ENET.A</i> Profile Event Out A (233) <i>ENET.B</i> Profile Event Out B (234) <i>ENET.C</i> Profile Event Out C (235) <i>ENET.D</i> Profile Event Out D (236) <i>ENET.E</i> Profile Event Out E (247) <i>ENET.F</i> Profile Event Out F (248) <i>ENET.G</i> Profile Event Out G (249) <i>ENET.H</i> Profile Event Out H (250) <i>FUN</i> Function Key (1001) <i>LGE</i> Logic (239) <i>LNR</i> Linearization (238) <i>MATH</i> Math (240) <i>PV</i> Process Value (241) <i>SOF.1</i> Special Function Output 1 (1532) <i>SOF.2</i> Special Function Output 2 (1533) <i>SOF.3</i> Special Function Output 3 (1534) <i>SOF.4</i> Special Function Output 4 (1535) <i>TPMR</i> Timer (244) <i>VAR</i> Variable (245) <i>HE</i> Heater Error (184)	Off	1828 [offset 30]	0x 6A (106) 13 to 245	39	6005	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
<i>F</i> , Fi	Digital Output (13 to 24) Output Function Instance Set the instance of the function selected above.	1 to 250	1	1830 [offset 30]	0x6A (106) 13 to 24 6	40	6006	uint RWES
<i>SZ</i>	Digital Output (13 to 24) Output Source Zone Set the zone of the function selected above.	0 to 24	0	1842 [offset 30]	0x6A (106) 13 to 24 0xC (12)	- - -	6012	uint RWES
<i>o.Ct</i>	Digital Output (13 to 24) Time Base Type Set the output control type. This parameter is only used with PID control, but can be set anytime.	<i>Ftb</i> Fixed Time Base (34) <i>utb</i> Variable Time Base (103)	Fixed Time Base	1822 [offset 30]	0x6A (106) 13 to 24 2	41	6002	uint RWES
<i>o.tb</i>	Digital Output (13 to 24) Fixed Time Base Set the time base for fixed-time-base control.	0.1 to 60.0 seconds	1.0	1824 [offset 30]	0x6A (106) 13 to 24 3	42	6003	float RWES
<i>o.lo</i>	Digital Output (13 to 24) Low Power Scale The power output will never be less than the value specified and will represent the value at which output scaling begins.	0.0 to 100.0	0.0	1836 [offset 30]	0x6A (106) 13 to 24 9	43	6009	float RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
<i>a.h</i> , o.hi	Digital Output (13 to 24) High Power Scale The power output will never be greater than the value specified and will represent the value at which output scaling stops.	0.0 to 100.0	100.0	1838 [offset 30]	0x6A (106) 1 to 12 A (10)	44	6010	float RWES

ACT

SET

Action Menu

<i>Fn</i> Fn	Action (1 to 16) Action Function Set the action that will be triggered by this function.	<i>none</i> None (61) <i>USr.r</i> User Settings Restore (227) <i>ALRM</i> Alarm (6) <i>SIL</i> Silence Alarms (108) <i>RoF</i> Control Loops Off and Alarms to Non-alarm State (220) <i>FAL</i> Force Alarm to Occur (218)	None	2184 [offset 20]	0x6E (110) 1 to 16 3	79	10003	uint RWES
<i>Fi</i> Fi	Action (1 to 16) Function Instance Set the instance of the function selected above.	0 to 25	0	2186 [offset 20]	0x6E (110) 1 to 16 4	80	10004	uint RWES

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **	
SFn.A	Action (1 to 16) Source Function A Set the event or function that will trigger the action.	<i>nonE</i> None (61) <i>ALR</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Enb.A</i> Profile Event Out A (233) <i>Enb.B</i> Profile Event Out B (234) <i>Enb.C</i> Profile Event Out C (235) <i>Enb.D</i> Profile Event Out D (236) <i>Enb.E</i> Profile Event Out E (247) <i>Enb.F</i> Profile Event Out F (248) <i>Enb.G</i> Profile Event Out G (249) <i>Enb.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>LIM</i> Limit (126) <i>LOG</i> Logic (239) <i>TRM</i> Timer (244) <i>Var</i> Variable (245) <i>hEr</i> Heater Error (184)		None	2190 [offset 20]	0x6E (110) 1 to 16 6	- - -	10006	uint RWES
Si.A	Action (1 to 16) Source Instance A Set the instance of the function selected above.	1 to 250	1	2182 [offset 20]	0x6E (110) 1 to 16 2	- - -	10002	uint RWES	
SZ.A	Action (1 to 16) Source Zone A Set the zone of the function selected above.	0 to 24	0	2192 [offset 20]	0x6E (110) 1 to 16 7	- - -	10007	uint RWES	
LEv	Action (1 to 16) Active Level Set the action that will be considered a true state.	<i>LoLd</i> Low (53) <i>hiH</i> High (37)	High	2180 [offset 20]	0x6E (110) 1 to 16 1	137	10001	uint RWES	

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
oEPE								
SET								
Output Menu								
Fn	Output Digital (1 to 4 and 7 to 10) Function Select what function will drive this output. Note: Limit function is available only for the slot in which the Limit resides.	<i>oFF</i> Off (62) <i>R</i> , Analog Input (142) <i>RLP7</i> Alarm (6) <i>CPr</i> Cool Power, Control Loop (161) <i>hPr</i> Heat Power, Control Loop (160) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Ent.A</i> Profile Event Out A (233) <i>Ent.b</i> Profile Event Out B (234) <i>Ent.C</i> Profile Event Out C (235) <i>Ent.d</i> Profile Event Out D (236) <i>Ent.E</i> Profile Event Out E (247) <i>Ent.F</i> Profile Event Out F (248) <i>Ent.G</i> Profile Event Out G (249) <i>Ent.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L9C</i> Logic (239) <i>Lnr</i> Linearization (238) <i>MATH</i> Math (240) <i>Pu</i> Process Value (241) <i>Sof.1</i> Special Function Output 1 (1532) <i>Sof.2</i> Special Function Output 2 (1533) <i>Sof.3</i> Special Function Output 3 (1534) <i>Sof.4</i> Special Function Output 4 (1535) <i>tPTr</i> Timer (244) <i>uAr</i> Variable (245) <i>hEr</i> Heater Error (184)	off	1828 [offset 30]	0x6A (106) 1 to 10 5	39	6005	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>F</i> , Fi	<i>Output Digital (1 to 4 and 7 to 10)</i> Output Function Instance Set the instance of the function selected above.	1 to 250	1	1830 [offset 30]	0x6A (106) 1 to 10 6	40	6006	uint RWES
<i>SZ.A</i>	<i>Output Digital (1 to 4 and 7 to 10)</i> Output Source Zone Set the instance of the function selected above.	0 to 24	0	1842 [offset 30]	0x6A (106) 1 to 10 0xC (12)	- - -	6012	uint RWES
<i>o.Ct</i>	<i>Output Digital (1 to 4 and 7 to 10)</i> Time Base Type Set the output control type. This parameter is only used with PID control, but can be set anytime.	<i>Ftb</i> Fixed Time Base (34) <i>utb</i> Variable Time Base (103)	Fixed Time Base	1822 [offset 30]	0x6A (106) 1 to 10 2	41	6002	uint RWES
<i>o.tb</i>	<i>Output Digital (1 to 4 and 7 to 10)</i> Fixed Time Base Set the time base for fixed-time-base control.	0.1 to 60.0 seconds (solid-state relay or switched dc) 5.0 to 60.0 seconds (mechanical relay or NO-ARC power control)	1.0 sec. [SSR & sw dc] 20.0 sec. [mech, relay, NO-ARC]	1824 [offset 30]	0x6A (106) 1 to 10 3	42	6003	float RWES
<i>o.lo</i>	<i>Output Digital (1 to 4 and 7 to 10)</i> Low Power Scale The power output will never be less than the value specified and will represent the value at which output scaling begins.	0.0 to 100.0%	0.0%	1836 [offset 30]	0x6A (106) 1 to 10 9	43	6009	float RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
<i>o.hi</i>	<i>Output Digital (1 to 4 and 7 to 10)</i> High Power Scale The power output will never be greater than the value specified and will represent the value at which output scaling stops.	0.0 to 100.0%	100.0%	1838 [offset 30]	0x6A (106) 1 to 10 0xA (10)	44	6010	float RWES
<i>o.ty</i>	<i>Output Process (1 to 3, and 7 to 9)</i> Type * Select whether the process output will operate in volts or millamps.	<i>uOLt</i> Volts (104) <i>P7RA</i> Millamps (112)	Volts	17546 [offset 60]	0x76 (118) 1-3, 7-9 1	- - -	18001	uint RWES
<i>Fn</i>	<i>Output Process (1 to 3, 7 to 9)</i> Function Set the type of function that will drive this output.	<i>oFF</i> Off (62) <i>A</i> , Analog Input (142) <i>Curr</i> Current (22) <i>CPr</i> Cool Power (161) <i>hPr</i> Heat Power (160) <i>PluJr</i> Power (73) <i>Lnr</i> Linearization (238) <i>P7RAt</i> Math (240) <i>Pu</i> Process Value (241) <i>SPC</i> Set Point Closed (242) <i>SPo</i> Set Point Open (243) <i>Sof.1</i> Special Function Output 1 (1532) <i>Sof.2</i> Special Function Output 2 (1533) <i>Sof.3</i> Special Function Output 3 (1534) <i>Sof.4</i> Special Function Output 4 (1535) <i>uAr</i> Variable (245) <i>LuRt</i> Wattage (1697) <i>Lduo</i> Load Voltage (1698) <i>Ldr</i> Load Resistance (1183)	Off	17548 [offset 60]	0x76 (118) 1-3, 7-9 2	- - -	18002	uint RWES

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>F</i> , Fi	<i>Output Process (1 to 3, 7 to 9)</i> Function Instance * Set the instance of the function selected above.	1 to 250	1	17522 [offset 60]	0x76 (118) 1-3, 7-9 4	- - - -	18004	uint RWES
<i>ZS.A</i>	<i>Output Process (1 to 3, 7 to 9)</i> Source Zone A * Set the zone of the function selected above.	0 to 24	0	17582 [offset 60]	0x76 (118) 1-3, 7-9 0x13 (19)	- - - -	18019	uint RWES
<i>S.L o</i> S.Lo	<i>Output Process (1 to 3, 7 to 9)</i> Scale Low * Set the scale low for process output in electrical units. This value, in volts or millamps, will correspond to 0% PID power output or the range low value.	-100.0 to 100.0	0.00	17562 [offset 60]	0x76 (118) 1-3, 7-9 9	99	18009	float RWES
<i>S.h ,</i> S.hi	<i>Output Process (1 to 3, 7 to 9)</i> Scale High * Set the scale high for process output in electrical units. This value, in volts or millamps, will correspond to 0% PID power output or the range high value.	-100.0 to 100.0	10.00	17564 [offset 60]	0x76 (118) 1-3, 7-9 0xA (10)	- - - -	18010	float RWES
<i>r.L o</i> r.Lo	<i>Output Process (1 to 3, 7 to 9)</i> Range Low * Use to set the minimum value in process units. This will correspond with the Scale Low value.	-1,999.000 to 9,999.000 °F or units -1,128.000 to 5,537.000 °C	0.0 °F or units -18 °C	17566 [offset 60]	0x76 (118) 1-3, 7-9 0xB (11)	- - - -	18011	float RWES

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
r.hi	<i>Output Process (1 to 3, 7 to 9)</i> Range High * Use to set the maximum value in process units. This will correspond with the Scale High value.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	100 F or units 38 C	17568 [offset 60]	0x76 (118) 1-3, 7-9 0xC (12)	- - - -	18012	float RWES
a.CA	<i>Output Process (1 to 3, 7 to 9)</i> Calibration Offset * Set an offset value for a process output.	-1,999.000 to 9,999.000°F or units -1,110.555 to 5,555.000°C	0.0°F or units 0.0°C	17558 [offset 60]	0x76 (118) 1-3, 7-9 7	- - - -	18007	float RWES
ALRM SET								
Alarm Menu								
A.ty	Alarm (1 to 16) Type Select whether the alarm trigger is a fixed value or will track the set point.	<i>oFF</i> Off (62) <i>Pr.RL</i> Process Alarm (76) <i>dERL</i> Deviation Alarm (24)	Off	2528 [offset 60]	0x6D (109) 1 to 16 0xF (15)	20	9015	uint RWES
Sr.A	Alarm (1 to 16) Alarm Source Select what will trigger this alarm.	<i>nonE</i> None (61) <i>R</i> , Analog Input (142) <i>Curr</i> Current (22) <i>Pwtr</i> Power (73) <i>Lnr</i> Linearization (238) <i>MATH</i> Math (240) <i>Pv</i> Process Value (241) <i>Var</i> Variable (245) <i>Cur</i> Current Read is Sample Hold (179) <i>Watt</i> Wattage (1697) <i>LV</i> Load Voltage (1698) <i>Ldr</i> Load Resistance (1183)	Analog Input	2532 [offset 60]	0x6D (109) 1 to 16 0x11 (17)	21	9017	uint RWES
iS.A	Alarm (1 to 16) Alarm Source Instance Set the instance of the function selected above.	1 to 250	1	2534 [offset 60]	0x6D (109) 1 to 16 0x12 (18)	22	9018	uint RWES

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
SZ A.SZ	Alarm (1 to 16) Alarm Source Zone Set the zone of the function selected above.	0 to 24	0	2548 [offset 60]	0x6D (109) 1 to 16 0x19 (25)	23	9025	uint RWES
A.hy	Alarm (1 to 16) Hysteresis Set the hysteresis for an alarm. This determines how far into the safe region the process value needs to move before the alarm can be cleared.	0.001 to 9,999.000 °F or units 0.001 to 5,555.000 °C	1.0 °F or units 1.0 °C	2504 [offset 60]	0x6D (109) 1 to 16 3	24	9003	float RWES
A.Lg	Alarm (1 to 16) Logic Select what the output condition will be during the alarm state.	RLC Close On Alarm (17) RLo Open On Alarm (66)	Close On Alarm	2508 [offset 60]	0x6D (109) 1 to 16 5	25	9005	uint RWES
A.Sd	Alarm (1 to 16) Sides Select which side or sides will trigger this alarm.	bOTH Both (13) hIGH High (37) LOW Low (53)	Both	2506 [offset 60]	0x6D (109) 1 to 16 4	26	9004	uint RWES
A.Lo	Alarm (1 to 16) Low Set Point * If Alarm Type (Setup Page, Alarm Menu) is set to: Process - set the process value that will trigger a low alarm.	-1,999.000 to 9,999.000 °F or units -1,128.000 to 5,537.000 °C	32.0 °F or units 0.0 °C	2502 [offset 60]	0x6D (109) 1 to 16 2	18	9002	float RWES
A.hi	Alarm (1 to 16) High Set Point If Alarm Type (Setup Page, Alarm Menu) is set to: Process - set the process value that will trigger a high alarm.	-1,999.000 to 9,999.000 °F or units -1,128.000 to 5,537.000 °C	300.0 °F or units 150.0 °C	2500 [offset 60]	0x6D (109) 1 to 16 1	19	9001	float RWES

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>A.LA</i>	Alarm (1 to 16) Latching Turn alarm latching on or off. A latched alarm has to be turned off by the user.	<i>nLAt</i> Non-Latching (60) <i>LAt</i> Latching (49)	Non-Latching	2512 [offset 60]	0x6D (109) 1 to 16 7	27	9007	uint RWES
<i>A.bL</i>	Alarm (1 to 16) Blocking Select when an alarm will be blocked. After startup and/or after the set point changes, the alarm will be blocked until the process value enters the normal range.	<i>oFF</i> Off (62) <i>Str</i> Startup (88) <i>StPt</i> Set Point (85) <i>boTh</i> Both (13)	Off	2514 [offset 60]	0x6D (109) 1 to 16 8	28	9008	uint RWES
<i>A.Si</i>	Alarm (1 to 16) Silencing Turn alarm silencing on to allow the user to disable this alarm.	<i>oFF</i> Off (62) <i>on</i> On (63)	Off	2510 [offset 60]	0x6D (109) 1 to 16 6	29	9006	uint RWES
<i>A.dSP</i>	Alarm (1 to 16) Display Display an alarm message when an alarm is active.	<i>oFF</i> Off (62) <i>on</i> On (63)	On	2530 [offset 60]	0x6D (109) 1 to 16 0x10 (16)	30	9016	uint RWES
<i>A.dL</i>	Alarm (1 to 16) Delay Time Set the span of time that the alarm will be delayed after the process value exceeds the alarm set point.	0 to 9,999 seconds	0	2540 [offset 60]	0x6D (109) 1 to 16 0x15 (21)	31	9021	uint RWES
<i>A.CLr</i>	Alarm (1 to 16) Clear Alarm Write to this register to clear an alarm	0	Ignore	- - - -	- - - -	- - - -	9026	uint W
<i>A.Sir</i>	Alarm (1 to 16) Silence Alarm Write to this register to silence an alarm	0	Ignore	- - - -	- - - -	- - - -	9027	uint W

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
A.St A.St	Alarm (1 to 16) Alarm State Current state of alarm	Startup (88) None (61) Blocked (12) Alarm low (8) Alarm high (7) Error (28)	Startup	- - - -	- - - -	- - - -	9009	uint R
Lnr SEE Linearization Menu								
Fn Fn	Linearization (1 to 24) Function Set how this function will linearize Source A.	OFF Off (62) int Interpolated (1482) Step Stepped (1483)	Off	11348 [offset 70]	0x86 (134) 1 to 24 5	86	34005	uint RWES
SFn.A SFn.A	Linearization (1 to 24) Source Function A Set the type of function that will be used for this source.	none None (61) R , Analog Input (142) Curr Current (22) CPr Cool Power, Control Loop (161) HPr Heat Power, Control Loop (160) PLUd Power, Control Loop (73) Lnr Linearization (238) MATH Math (240) Pu Process Value (241) SPC Set Point Closed, Control Loop (242) SPo Set Point Open, Control Loop (243) Var Variable (245)	None	11340 [offset 70]	0x86 (134) 1 to 24 1	- - - -	34001	uint RWES
Si.A Si.A	Linearization (1 to 24) Source Instance A Set the instance of the function selected above.	1 to 250	1	11342 [offset 70]	0x86 (134) 1 to 24 2	- - - -	34002	uint RWES
SZ.A SZ.A	Linearization (1 to 24) Source Zone A Set the zone of the function selected above.	0 or 24	0	11344 [offset 70]	0x86 (134) 1 to 24 3	- - - -	34003	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>Unit</i>	Linearization (1 to 24) Units Set the units of the output value.	<i>Src</i> Source (1539) <i>none</i> None (61) <i>Atp</i> Absolute Temperature (1540) <i>rtP</i> Relative Temperature (1541) <i>Plur</i> Power (73) <i>Pro</i> Process (75) <i>rh</i> Relative Humidity (1538)	Source	11396 [offset 70]	0x86 (134) 1 to 24 0x1D (29)	87	34029	uint RWES
<i>ip.1</i>	Linearization (1 to 24) Input Point 1 Set the value that will be mapped to output 1.	-1,999.000 to 9,999.000	0.0	11354 [offset 70]	0x86 (134) 1 to 24 8	88	34008	float RWES
<i>op.1</i>	Linearization (1 to 24) Output Point 1 Set the value that will be mapped to input 1.	-1,999.000 to 9,999.000	0.0	11374 [offset 70]	0x86 (134) 1 to 24 0x12 (18)	89	34018	float RWES
<i>ip.2</i>	Linearization (1 to 24) Input Point 2 Set the value that will be mapped to output 2.	-1,999.000 to 9,999.000	1.0	11356 [offset 70]	0x86 (134) 1 to 24 9	90	34009	float RWES
<i>op.2</i>	Linearization (1 to 24) Output Point 2 Set the value that will be mapped to input 2.	-1,999.000 to 9,999.000	1.0	11376 [offset 70]	0x86 (134) 1 to 24 0x13 (19)	91	34019	float RWES
<i>ip.3</i>	Linearization (1 to 24) Input Point 3 Set the value that will be mapped to output 3.	-1,999.000 to 9,999.000	2.0	11358 [offset 70]	0x86 (134) 1 to 24 0xA (10)	92	34010	float RWES
<i>op.3</i>	Linearization (1 to 24) Output Point 3 Set the value that will be mapped to input 3.	-1,999.000 to 9,999.000	2.0	11378 [offset 70]	0x86 (134) 1 to 24 0x14 (20)	93	34020	float RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>P.4</i> ip.4	<i>Linearization (1 to 24)</i> Input Point 4 Set the value that will be mapped to output 4.	-1,999.000 to 9,999.000	3.0	11360 [offset 70]	0x86 (134) 1 to 24 0xB (11)	94	34011	float RWES
<i>oP.4</i> op.4	<i>Linearization (1 to 24)</i> Output Point 4 Set the value that will be mapped to input 4.	-1,999.000 to 9,999.000	3.0	11380 [offset 70]	0x86 (134) 1 to 24 0x15 (21)	95	34021	float RWES
<i>P.5</i> ip.5	<i>Linearization (1 to 24)</i> Input Point 5 Set the value that will be mapped to output 5.	-1,999.000 to 9,999.000	4.0	11362 [offset 70]	0x86 (134) 1 to 24 0xC (12)	96	34012	float RWES
<i>oP.5</i> op.5	<i>Linearization (1 to 24)</i> Output Point 5 Set the value that will be mapped to input 5.	-1,999.000 to 9,999.000	4.0	11382 [offset 70]	0x86 (134) 1 to 24 0x16 (22)	97	34022	float RWES
<i>P.6</i> ip.6	<i>Linearization (1 to 24)</i> Input Point 6 Set the value that will be mapped to output 6.	-1,999.000 to 9,999.000	5.0	11364 [offset 70]	0x86 (134) 1 to 24 0xD (13)	98	34013	float RWES
<i>oP.6</i> op.6	<i>Linearization (1 to 24)</i> Output Point 6 Set the value that will be mapped to input 6.	-1,999.000 to 9,999.000	5.0	11384 [offset 70]	0x86 (134) 1 to 24 0x17 (23)	99	34023	float RWES
<i>P.7</i> ip.7	<i>Linearization (1 to 24)</i> Input Point 7 Set the value that will be mapped to output 7.	-1,999.000 to 9,999.000	6.0	11366 [offset 70]	0x86 (134) 1 to 24 E (14)	100	34014	float RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>oP.7</i> op.7	<i>Linearization (1 to 24)</i> Output Point 7 Set the value that will be mapped to input 7.	-1,999.000 to 9,999.000	6.0	11386 [offset 70]	0x86 (134) 1 to 24 0x18 (24)	101	34024	float RWES
<i>iP.8</i> ip.8	<i>Linearization (1 to 24)</i> Input Point 8 Set the value that will be mapped to output 8.	-1,999.000 to 9,999.000	7.0	11368 [offset 70]	0x86 (134) 1 to 24 0xF (15)	102	34015	float RWES
<i>oP.8</i> op.8	<i>Linearization (1 to 24)</i> Output Point 8 Set the value that will be mapped to input 8.	-1,999.000 to 9,999.000	7.0	11388 [offset 70]	0x86 (134) 1 to 24 0x19 (25)	103	34025	float RWES
<i>iP.9</i> ip.9	<i>Linearization (1 to 24)</i> Input Point 9 Set the value that will be mapped to output 9.	-1,999.000 to 9,999.000	8.0	11370 [offset 70]	0x86 (134) 1 to 24 0x10 (16)	104	34016	float RWES
<i>oP.9</i> op.9	<i>Linearization (1 to 24)</i> Output Point 9 Set the value that will be mapped to input 9.	-1,999.000 to 9,999.000	8.0	11390 [offset 70]	0x86 (134) 1 to 24 0x1A (26)	105	34026	float RWES
<i>iP.10</i> ip.10	<i>Linearization (1 to 24)</i> Input Point 10 Set the value that will be mapped to output 10.	-1,999.000 to 9,999.000	9.0	11372 [offset 70]	0x86 (134) 1 to 24 0x11 (17)	106	34017	float RWES
<i>oP.10</i> op.10	<i>Linearization (1 to 24)</i> Output Point 10 Set the value that will be mapped to input 10.	-1,999.000 to 9,999.000	9.0	11392 [offset 70]	0x86 (134) 1 to 24 0x1B (27)	107	34027	float RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
CPE SET								
Compare Menu								
<i>Fn</i>	Fn <i>Compare (1 to 24)</i> Function Set operator that will be used to compare Source A to Source B.	<i>oFF</i> Off (62) <i>gT</i> Greater Than (1435) <i>lT</i> Less Than (1436) <i>E</i> Equal To (1437) <i>nE</i> Not Equal To (1438) <i>gOE</i> Greater or Equal (1439) <i>lOE</i> Less or Equal (1440)	Off	8236 [offset 40]	0x80 (128) 1 to 24 9	137	28009	uint RWES
<i>tol</i>	tol <i>Compare (1 to 24)</i> Tolerance If the difference between Source A and Source B is less than this value the two will appear to be equal.	0 to 9,999.000	0.1	8240 [offset 40]	0x80 (128) 1 to 24 0xB (11)	138	28011	float RWES
<i>SFnA</i>	SFn.A <i>Compare (1 to 24)</i> Source Function A Set the type of function that will be used for this source.	<i>none</i> None (61) <i>A</i> Analog Input (142) <i>Curr</i> Current (22) <i>CPr</i> Cool Power, Control Loop (161) <i>hPr</i> Heat Power, Control Loop (160) <i>PLUr</i> Power, Control Loop (73) <i>Lnr</i> Linearization (238) <i>PTAE</i> Math (240) <i>Pu</i> Process Value (241) <i>SPC</i> Set Point Closed, Control Loop (242) <i>SPo</i> Set Point Open, Control Loop (243) <i>uAr</i> Variable (245) <i>Watt</i> Wattage (1697) <i>LdUo</i> Load Voltage (1698) <i>Ldr</i> Load Resistance (1183)	None	8220 [offset 40]	0x80 (128) 1 to 24 1	- - -	28001	uint RWES
<i>Si.A</i>	Si.A <i>Compare (1 to 24)</i> Source Instance A Set the instance of the function selected above.	1 to 250	1	8224 [offset 40]	0x80 (128) 1 to 24 3	- - -	28003	uint RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SZ.A SZ.A	Compare (1 to 24) Source Zone A Set the zone of the function selected above.	0 to 24	0	8228 [offset 40]	0x80 (128) 1 to 24 5	- - - -	28005	uint RWES
SFn.b SFn.b	Compare (1 to 24) Source Function B Set the type of function that will be used for this source. This represents the timer reset signal.	<i>None</i> None (61) <i>R</i> , Analog Input (142) <i>Curr</i> Current (22) <i>CPr</i> Cool Power, Control Loop (161) <i>HPr</i> Heat Power, Control Loop (160) <i>PLDr</i> Power, Control Loop (73) <i>Lnr</i> Linearization (238) <i>PMT</i> Math (240) <i>Pu</i> Process Value (241) <i>SPC</i> Set Point Closed, Control Loop (242) <i>SPo</i> Set Point Open, Control Loop (243) <i>uAr</i> Variable (245) <i>Wattage</i> (1697) <i>LdUo</i> Load Voltage (1698) <i>Ldr</i> Load Resistance (1183)	None	8222 [offset 40]	0x80 (128) 1 to 24 2	- - - -	28002	uint RWES
Si.b Si.b	Compare (1 to 24) Source Instance B Set the instance of the function selected above.	1 to 250	1	8226 [offset 40]	0x80 (128) 1 to 24 4	- - - -	28004	uint RWES
SZ.b SZ.b	Compare (1 to 24) Source Zone B Set the zone of the function selected above.	0 to 24	0	8230 [offset 40]	0x80 (128) 1 to 24 6	- - - -	28006	uint RWES
Er.h Er.h	Compare (1 to 24) Error Handling Use Error Handling to select the output value and error output state of this function if it receives an error signal from one or more sources and it cannot determine the output value.	<i>TG</i> True Good (1476) <i>TB</i> True Bad (1477) <i>FG</i> False Good (1478) <i>FB</i> False Bad (1479)	False Bad	8242 [offset 40]	0x80 (128) 1 to 24 0xC (12)	- - - -	28012	uint RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
EPR SET Timer Menu								
Fn Fn	Timer (1 to 24) Function Set how the timer will function.	<i>oFF</i> Off (62) <i>onP</i> On Pulse (1471) <i>dEL</i> Delay (1472) <i>a5</i> One Shot (1473) <i>rEt</i> Retentive (1474)	Off	10156 [offset 50]	0x83 (131) 1 to 24 9	131	31009	uint RWES
SFn.A SFn.A	Timer (1 to 24) Source Function A Set the type of function that will be used for this source. This represents the timer run signal.	<i>nOnE</i> None (61) <i>ALRM</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>DOI</i> Digital I/O (1142) <i>EnEA</i> Profile Event Out A (233) <i>EnEB</i> Profile Event Out B (234) <i>EnEC</i> Profile Event Out C (235) <i>EnED</i> Profile Event Out D (236) <i>EnEE</i> Profile Event Out E (247) <i>EnEF</i> Profile Event Out F (248) <i>EnEG</i> Profile Event Out G (249) <i>EnEH</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L9C</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>EPR</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uAr</i> Variable (245)	None	10140 [offset 50]	0x83 (131) 1 to 24 1	- - - -	31001	uint RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
5.R Si.A	Timer (1 to 24) Source Instance A Set the instance of the function selected above.	1 to 250	1	10144 [offset 50]	0x83 (131) 1 to 24 3	- - - -	31003	uint RWES
5.Z.R SZ.A	Timer (1 to 24) Source Zone A Set the zone of the function selected above.	0 to 24	0	10148 [offset 50]	0x83 (131) 1 to 24 5	- - - -	31005	uint RWES
5.S.R SAS.A	Timer (1 to 24) Run Active Level Set what state will be read as on.	High Low	High	10160 [offset 50]	0x83 (131) 1 to 24 0xB (11)	- - - -	31011	uint RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
SFn.b	Timer (1 to 24) Source Function B Set the type of function that will be used to reset a retentive timer.	<i>nonE</i> None (61) <i>ALR7</i> Alarm (6) <i>CPr</i> Cool Power (161) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>dIO</i> Digital I/O (1142) <i>EntA</i> Profile Event Out A (233) <i>EntB</i> Profile Event Out B (234) <i>EntC</i> Profile Event Out C (235) <i>EntD</i> Profile Event Out D (236) <i>EntE</i> Profile Event Out E (247) <i>EntF</i> Profile Event Out F (248) <i>EntG</i> Profile Event Out G (249) <i>EntH</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L9C</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>TPTr</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uRr</i> Variable (245)	None	10142 [offset 50]	0x83 (131) 1 to 24 2	- - -	31002	uint RWES
Si.b	Timer (1 to 24) Source Instance B Set the instance of the function selected above.	1 to 250	1	10146 [offset 50]	0x83 (131) 1 to 24 4	- - -	31004	uint RWES
SZ.b	Timer (1 to 24) Source Zone B Set the zone of the function selected above.	0 to 24	0	10150 [offset 50]	0x83 (131) 1 to 24 6	- - -	31006	uint RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SAS.b	Timer (1 to 24) Reset Active Level Set what state will be read as on.	h _{19h} High (37) L _{0bJ} Low (53)	High	10162 [offset 50]	0x83 (131) 1 to 24 0xC (12)	- - - -	31012	uint RWES
E _{ti}	Timer (1 to 24) Time Set the time span that will be measured in tenths of a second.	0 to 9,999.000	0.1	10164 [offset 50]	0x83 (131) 1 to 24 0xD (13)	224	31013	float RWES
LE _{Ev}	Timer (1 to 24) Transmitter Active Level Set which output state will indicate on.	h _{19h} High (37) L _{0bJ} Low (53)	High	10166 [offset 50]	0x83 (131) 1 to 24 0xE (14)	- - - -	31014	uint RWES
Fn Fn Counter Menu								
F _n	Counter (1 to 24) Function Set whether the counter increments or decrements the count value. Decrementing 0 returns 9,999. Incrementing 9,999 returns 0.	UP Up (1456) dn Down (1457)	Up	9196 [offset 40]	0x82 (130) 1 to 24 9	- - - -	30009	uint RWES
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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.A	Counter (1 to 24) Source Function A Set the type of function that will be used for the counter clock signal.	<i>nonE</i> None (61) <i>ALM</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>dIO</i> Digital I/O (1142) <i>EnbA</i> Profile Event Out A (233) <i>EnbB</i> Profile Event Out B (234) <i>EnbC</i> Profile Event Out C (235) <i>EnbD</i> Profile Event Out D (236) <i>EnbE</i> Profile Event Out E (247) <i>EnbF</i> Profile Event Out F (248) <i>EnbG</i> Profile Event Out G (249) <i>EnbH</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>LgC</i> Logic (239) <i>TPtr</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uRr</i> Variable (245)	None	9180 [offset 40]	0x82 (130) 1 to 24 1	- - -	30001	uint RWES
Si.A	Counter (1 to 24) Source Instance A Set the instance of the function selected above.	1 to 250	1	9184 [offset 40]	0x82 (130) 1 to 24 3	- - -	30003	uint RWES
SZ.A	Counter (1 to 24) Source Zone A Set the zone of the function selected above.	0 to 24	0	9188 [offset 40]	0x82 (130) 1 to 24 5	- - -	30005	uint RWES
SAS.A	Counter (1 to 24) Count Active Level Set what output state will indicate on.	<i>both</i> Both (130) <i>hgh</i> High (37) <i>low</i> Low (53)	High	9200 [offset 40]	0x82 (130) 1 to 24 0xB (11)	- - -	30011	uint RWES

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Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
SFn.b SFn.b	Counter (1 to 24) Source Function B Set the type of function that will be used for the counter load signal.	<i>none</i> None (61) <i>ALM</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>dIO</i> Digital I/O (1142) <i>Ent.R</i> Profile Event Out A (233) <i>Ent.b</i> Profile Event Out B (234) <i>Ent.C</i> Profile Event Out C (235) <i>Ent.D</i> Profile Event Out D (236) <i>Ent.E</i> Profile Event Out E (247) <i>Ent.F</i> Profile Event Out F (248) <i>Ent.G</i> Profile Event Out G (249) <i>Ent.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L9C</i> Logic (239) <i>tMR</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uAr</i> Variable (245)	None	9182 [offset 40]	0x82 (130) 1 to 24 2	- - - -	30002	uint RWES
Si.b Si.b	Counter (1 to 24) Source Instance B Set the instance of the function selected above.	1 to 250	1	9186 [offset 40]	0x82 (130) 1 to 24 4	- - - -	30004	uint RWES
SZ.b SZ.b	Counter (1 to 24) Source Zone B Set the zone of the function selected above.	0 to 24	0	9190 [offset 40]	0x82 (130) 1 to 24 6	- - - -	30006	uint RWES
SAS.b SAS.b	Counter (1 to 24) Reset Active Level Set what output state will indicate on.	<i>both</i> Both (130) <i>high</i> High (37) <i>low</i> Low (53)	High	9202 [offset 40]	0x82 (130) 1 to 24 0x0C (12)	- - - -	30012	uint RWES
LoAd LoAd	Counter (1 to 24) Load Value Set the counter's initial value.	0 to 9,999	0	9204 [offset 40]	0x82 (130) 1 to 24 (13)	123	30013	uint RWES

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<i>Er9t</i> trgt	Counter (1 to 24) Target Value Set the value that will turn the output value on.	0 to 9,999	9,999	9206 [offset 40]	0x82 (130) 1 to 24 0xE (14)	124	30014	uint RWES
<i>LAt</i> LAt	Counter (1 to 24) Latching Output latched.	<i>no</i> No (59) <i>YES</i> Yes (106)	No	9212 [offset 40]	0x82 (130) 1 to 24 0x11 (17)	126	30017	uint RWES
L9C SET Logic Menu								
<i>Fn</i> Fn	Logic (1 to 24) Function Set the operator that will be used to compare the sources.	<i>oFF</i> Off (62) <i>And</i> And (1426) <i>nAnd</i> Nand (1427) <i>or</i> Or (1442) <i>nor</i> Nor (1443) <i>E</i> Equal To (1437) <i>nE</i> Not Equal To (1438) <i>LAt</i> Latch (1444) <i>rSFF</i> RS Flip-Flop (1693)	Off	6364 [offset 80]	0x7F (127) 1 to 24 0x21 (33)	143	27033	uint RWES
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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.A	SFn.A Logic (1 to 24) Source Function A Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALP7</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Ent.R</i> Profile Event Out A (233) <i>Ent.b</i> Profile Event Out B (234) <i>Ent.c</i> Profile Event Out C (235) <i>Ent.d</i> Profile Event Out D (236) <i>Ent.E</i> Profile Event Out E (247) <i>Ent.F</i> Profile Event Out F (248) <i>Ent.G</i> Profile Event Out G (249) <i>Ent.h</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L iP7</i> Limit (126) <i>L 9C</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>tP7r</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uAr</i> Variable (245)	None	6300 [offset 80]	0x7F (127) 1 to 24 1	- - - -	27001	uint RWES
Si.A	Si.A Logic (1 to 24) Source Instance A Set the instance of the function selected above.	1 to 250	1	6316 [offset 80]	0x7F (127) 1 to 24 9	- - - -	27009	uint RWES
SZ.A	SZ.A Logic (1 to 24) Source Zone A Set the zone of the function selected above.	0 to 24	0	6332 [offset 80]	0x7F (127) 1 to 24 0x11 (17)	- - - -	27017	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.b SFn.b	<i>Logic (1 to 24)</i> Source Function B Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALR</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Enb.A</i> Profile Event Out A (233) <i>Enb.B</i> Profile Event Out B (234) <i>Enb.C</i> Profile Event Out C (235) <i>Enb.D</i> Profile Event Out D (236) <i>Enb.E</i> Profile Event Out E (247) <i>Enb.F</i> Profile Event Out F (248) <i>Enb.G</i> Profile Event Out G (249) <i>Enb.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L.PT</i> Limit (126) <i>L9C</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>tPT</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uRr</i> Variable (245)	None	6302 [offset 80]	0x7F (127) 1 to 24 2	- - -	27002	uint RWES
Si.b Si.b	<i>Logic (1 to 24)</i> Source Instance B Set the instance of the function selected above.	1 to 250	1	6318 [offset 80]	0x7F (127) 1 to 24 0xA (10)	- - -	27010	uint RWES
SZ.b SZ.b	<i>Logic (1 to 24)</i> Source Zone B Set the zone of the function selected above	0 to 24	0	6334 [offset 80]	0x7F (127) 1 to 24 0x12 (18)	- - -	27018	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.C	SFn.C <i>Logic (1 to 24)</i> Source Function C Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALM</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>dIO</i> Digital I/O (1142) <i>EntA</i> Profile Event Out A (233) <i>EntB</i> Profile Event Out B (234) <i>EntC</i> Profile Event Out C (235) <i>EntD</i> Profile Event Out D (236) <i>EntE</i> Profile Event Out E (247) <i>EntF</i> Profile Event Out F (248) <i>EntG</i> Profile Event Out G (249) <i>EntH</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>LIM</i> Limit (126) <i>LOG</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>TPTr</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uAr</i> Variable (245)	None	6304 [offset 80]	0x7F (127) 1 to 24 3	- - - -	27003	uint RWES
Si.C	Si.C <i>Logic (1 to 24)</i> Source Instance C Set the instance of the function selected above.	1 to 250	1	6320 [offset 80]	0x7F (127) 1 to 24 0xB (11)	- - - -	27011	uint RWES
SZ.C	SZ.C <i>Logic (1 to 24)</i> Source Zone C Set the zone of the function selected above.	0 to 24	0	6336 [offset 80]	0x7F (127) 1 to 24 0x13 (19)	- - - -	27019	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.d SFn.d	Logic (1 to 24) Source Function D Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALR</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Enb.A</i> Profile Event Out A (233) <i>Enb.B</i> Profile Event Out B (234) <i>Enb.C</i> Profile Event Out C (235) <i>Enb.D</i> Profile Event Out D (236) <i>Enb.E</i> Profile Event Out E (247) <i>Enb.F</i> Profile Event Out F (248) <i>Enb.G</i> Profile Event Out G (249) <i>Enb.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L.PT</i> Limit (126) <i>L9C</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>tPT</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uRr</i> Variable (245)	None	6306 [offset 80]	0x7F (127) 1 to 24 4	- - - -	27004	uint RWES
Si.d Si.d	Logic (1 to 24) Source Instance D Set the instance of the function selected above.	1 to 250	1	6322 [offset 80]	0x7F (127) 1 to 24 0xC (12)	- - - -	27012	uint RWES
SZ.d SZ.d	Logic (1 to 24) Source Zone D Set the zone of the function selected above.	0 to 24	0	6338 [offset 80]	0x7F (127) 1 to 24 0x14 (20)	- - - -	27020	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.E	Logic (1 to 24) Source Function E Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALP7</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Ent.R</i> Profile Event Out A (233) <i>Ent.b</i> Profile Event Out B (234) <i>Ent.c</i> Profile Event Out C (235) <i>Ent.d</i> Profile Event Out D (236) <i>Ent.e</i> Profile Event Out E (247) <i>Ent.f</i> Profile Event Out F (248) <i>Ent.g</i> Profile Event Out G (249) <i>Ent.h</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L iP7</i> Limit (126) <i>L 9C</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>tP7r</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uRr</i> Variable (245)	None	6308 [offset 80]	0x7F (127) 1 to 24 5	- - - -	27005	uint RWES
Si.E	Logic (1 to 24) Source Instance E Set the instance of the function selected above.	1 to 250	1	6324 [offset 80]	0x7F (127) 1 to 24 D (13)	- - - -	27013	uint RWES
SZ.E	Logic (1 to 24) Source Zone E Set the zone of the function selected above.	0 to 24	0	6340 [offset 80]	0x7F (127) 1 to 24 0x15 (21)	- - - -	27021	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.F	SFn.F Logic (1 to 24) Source Function F Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALR</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Enb.A</i> Profile Event Out A (233) <i>Enb.B</i> Profile Event Out B (234) <i>Enb.C</i> Profile Event Out C (235) <i>Enb.D</i> Profile Event Out D (236) <i>Enb.E</i> Profile Event Out E (247) <i>Enb.F</i> Profile Event Out F (248) <i>Enb.G</i> Profile Event Out G (249) <i>Enb.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>LIM</i> Limit (126) <i>LOG</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>TR</i> Timer (244) <i>hEr</i> Heater Error (184) <i>Var</i> Variable (245)	None	6310 [offset 80]	0x7F (127) 1 to 24 6	- - -	27006	uint RWES
Si.F	Si.F Logic (1 to 24) Source Instance F Set the instance of the function selected above.	1 to 250	1	6326 [offset 80]	0x7F (127) 1 to 24 0xE (14)	- - -	27014	uint RWES
SF.F	SF.F Logic (1 to 24) Source Zone F Set the zone of the function selected above.	0 to 24	0	6342 [offset 80]	0x7F (127) 1 to 24 0x16 (22)	- - -	27022	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.g	Logic (1 to 24) Source Function G Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALP7</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Ent.R</i> Profile Event Out A (233) <i>Ent.b</i> Profile Event Out B (234) <i>Ent.C</i> Profile Event Out C (235) <i>Ent.D</i> Profile Event Out D (236) <i>Ent.E</i> Profile Event Out E (247) <i>Ent.F</i> Profile Event Out F (248) <i>Ent.G</i> Profile Event Out G (249) <i>Ent.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L IP7</i> Limit (126) <i>L 9C</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>tP7r</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uRr</i> Variable (245)	None	6312 [offset 80]	0x7F (127) 1 to 24 7	- - - -	27007	uint RWES
Si.g	Logic (1 to 24) Source Instance G Set the instance of the function selected above.	1 to 250	1	6328 [offset 80]	0x7F (127) 1 to 24 0xF (15)	- - - -	27015	uint RWES
SZ.g	Logic (1 to 24) Source Zone G Set the zone of the function selected above.	0 to 24	0	6344 [offset 80]	0x7F (127) 1 to 24 0x17 (23)	- - - -	27023	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.h	Logic (1 to 24) Source Function H Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALR</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Enk.A</i> Profile Event Out A (233) <i>Enk.B</i> Profile Event Out B (234) <i>Enk.C</i> Profile Event Out C (235) <i>Enk.D</i> Profile Event Out D (236) <i>Enk.E</i> Profile Event Out E (247) <i>Enk.F</i> Profile Event Out F (248) <i>Enk.G</i> Profile Event Out G (249) <i>Enk.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>LIM</i> Limit (126) <i>LIC</i> Logic (239) <i>SoF.1</i> Special Function Output 1 (1532) <i>SoF.2</i> Special Function Output 2 (1533) <i>SoF.3</i> Special Function Output 3 (1534) <i>SoF.4</i> Special Function Output 4 (1535) <i>TPTr</i> Timer (244) <i>hEr</i> Heater Error (184) <i>uRr</i> Variable (245)	None	6314 [offset 80]	0x7F (127) 1 to 24 8	- - - -	27008	uint RWES
Si.h	Logic (1 to 24) Source Instance H Set the instance of the function selected above.	1 to 250	1	6330 [offset 80]	0x7F (127) 1 to 24 0x10 (16)	- - - -	27016	uint RWES
SZ.h	Logic (1 to 24) Source Zone H Set the zone of the function selected above.	0 to 24	0	6346 [offset 80]	0x7F (127) 1 to 24 0x18 (24)	- - - -	27024	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
<i>Er.h</i> Er.h	Logic (1 to 24) Error Handling Use to select the output value and error output state of this function if it receives an error signal from one or more sources and it cannot determine the output value.	<i>E.g</i> True Good (1476) <i>E.b</i> True Bad (1477) <i>F.g</i> False Good (1478) <i>F.b</i> False Bad (1479)	False Bad	6368 [offset 80]	0x7F (127) 1 to 24 0x23 (35)	- - -	27035	uint RWES

PARE

SET

Math Menu

<i>F<small>n</small></i> Fn	Math (1 to 24) Function Set the operator that will be applied to the sources.	<i>oFF</i> Off (62) <i>A<small>ve</small>g</i> Average (1367) <i>P<small>ro</small>c<small>ess</small></i> Process Scale (1371) <i>d<small>ev</small>a<small>t</small>i<small>on</small></i> Deviation Scale (1372) <i>S<small>witch</small> O<small>ver</small></i> Switch Over (1370) <i>d<small>iff</small>e<small>re</small>n<small>t</small></i> Differential (1373) <i>r<small>ati</small>o</i> Ratio (1374) <i>Add</i> Add (1375) <i>M<small>ul</small>ti</i> Multiply (1376) <i>A<small>bs</small>ol<u>u</u><i>te</i></i> Absolute Difference (1377) <i>M<small>in</small>im<u>u</u><i>m</i></i> Minimum (1378) <i>M<small>ax</small>im<u>u</u><i>m</i></i> Maximum (1379) <i>S<small>qua</small>r<u>u</u><i>e</i></i> Square Root (1380) <i>Sam<u>ple</u> And Hold</i> Sample and Hold (1381) <i>P<small>res</small>u<small>re</small> To Altitude</i> Pressure to Altitude (1649) <i>D<small>ew</small> P<small>oint</small></i> Dew Point (1650) <i>W<small>attage</small></i> Wattage (1697) <i>L<small>oad</small> V<small>oltage</small></i> Load Voltage (1698) <i>L<small>oad</small> R<small>esistance</small></i> Load Resistance (1183)	Off	3540 [offset 70]	0x7D (125) 1 to 24 0x15 (21)	69	25021	uint RWES
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** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.A	SFn.A Source Function A Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>A</i> , Analog Input (142) <i>Curr</i> Current (22) <i>CPr</i> Cool Power, Control Loop (161) <i>hPr</i> Heat Power, Control Loop (160) <i>PLdr</i> Power, Control Loop (73) <i>Lnr</i> Linearization (238) <i>MATH</i> Math (240) <i>Pu</i> Process Value (241) <i>SPC</i> Set Point Closed, Control Loop (242) <i>SPo</i> Set Point Open, Control Loop (243) <i>uRr</i> Variable (245)	None	3500 [offset 70]	0x7D (125) 1 to 24 1	- - - -	25001	uint RWES
Si.A	Si.A Source Instance A Set the instance of the function selected above.	1 to 250	1	3510 [offset 70]	0x7D (125) 1 to 24 6	- - - -	25006	uint RWES
SZ.A	SZ.A Source Zone A Set the zone of the function selected above.	0 to 24	0	3520 [offset 70]	0x7D (125) 1 to 24 0xB (11)	- - - -	25011	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
SFn.b SFn.b	Math (1 to 24) Source Function B Set the type of function that will be used for this source.	<p><i>None</i> None (61) <i>R</i>, Analog Input (142) <i>Curr</i> Current (22) <i>CPr</i> Cool Power, Control Loop (161) <i>hPr</i> Heat Power, Control Loop (160) <i>PLdr</i> Power, Control Loop (73) <i>Lnr</i> Linearization (238) <i>PATE</i> Math (240) <i>Pu</i> Process Value (241) <i>SPC</i> Set Point Closed, Control Loop (242) <i>SPo</i> Set Point Open, Control Loop (243) <i>uAr</i> Variable (245) <i>Wattage</i> (1697) <i>LdUo</i> Load Voltage (1698) <i>Ldr</i> Load Resistance (1183)</p>	None	3502 [offset 70]	0x7D (125) 1 to 24 2	- - - -	25002	uint RWES
Si.b Si.b	Math (1 to 24) Source Instance B Set the instance of the function selected above.	1 to 250	1	3512 [offset 70]	0x7D (125) 1 to 24 7	- - - -	25007	uint RWES
SZ.b SZ.b	Math (1 to 24) Source Zone B Set the zone of the function selected above.	0 to 24	0	3522 [offset 70]	0x7D (125) 1 to 24 0xC (12)	- - - -	25012	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.C	Source Function C Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>A</i> , Analog Input (142) <i>Curr</i> Current (22) <i>CPr</i> Cool Power, Control Loop (161) <i>hPr</i> Heat Power, Control Loop (160) <i>PLdr</i> Power, Control Loop (73) <i>Lnr</i> Linearization (238) <i>PnRe</i> Math (240) <i>Pu</i> Process Value (241) <i>SP.C</i> Set Point Closed, Control Loop (242) <i>SP.O</i> Set Point Open, Control Loop (243) <i>uRr</i> Variable (245) <i>Wattage</i> (1697) <i>LdUo</i> Load Voltage (1698) <i>Ldr</i> Load Resistance (1183)	None	3504 [offset 70]	0x7D (125) 1 to 24 3	- - -	25003	uint RWES
Si.C	Source Instance C Set the instance of the function selected above.	1 to 250	1	3514 [offset 70]	0x7D (125) 1 to 24 8	- - -	25008	uint RWES
SZ.C	Source Zone C Set the zone of the function selected above.	0 to 24	0	3524 [offset 70]	0x7D (125) 1 to 24 0xD (13)	- - -	25013	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
SFn.d SFn.d	Math (1 to 24) Source Function D Set the type of function that will be used for this source.	<p><i>None</i> None (61) <i>R</i>, Analog Input (142) <i>Curr</i> Current (22) <i>CPr</i> Cool Power, Control Loop (161) <i>hPr</i> Heat Power, Control Loop (160) <i>PLdr</i> Power, Control Loop (73) <i>Lnr</i> Linearization (238) <i>PATE</i> Math (240) <i>Pu</i> Process Value (241) <i>SPC</i> Set Point Closed, Control Loop (242) <i>SPo</i> Set Point Open, Control Loop (243) <i>uAr</i> Variable (245) <i>Wattage</i> Wattage (1697) <i>LdUo</i> Load Voltage (1698) <i>Ldr</i> Load Resistance (1183)</p>	None	3506 [offset 70]	0x7D (125) 1 to 24 4	- - - -	25004	uint RWES
Si.d Si.d	Math (1 to 24) Source Instance D Set the instance of the function selected above.	1 to 250	1	3516 [offset 70]	0x7D (125) 1 to 24 9	- - - -	25009	uint RWES
SZ.d SZ.d	Math (1 to 24) Source Zone D Set the zone of the function selected above.	0 to 24	0	3526 [offset 70]	0x7D (125) 1 to 24 0xE (14)	- - - -	25014	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
SFn.E	SFn.E Math (1 to 24) Source Function E Set the type of function that will be used for this source.	<i>nonE</i> None (61) <i>ALR</i> Alarm (6) <i>CPE</i> Compare (230) <i>Ctr</i> Counter (231) <i>d io</i> Digital I/O (1142) <i>Enb.A</i> Profile Event Out A (233) <i>Enb.B</i> Profile Event Out B (234) <i>Enb.C</i> Profile Event Out C (235) <i>Enb.D</i> Profile Event Out D (236) <i>Enb.E</i> Profile Event Out E (247) <i>Enb.F</i> Profile Event Out F (248) <i>Enb.G</i> Profile Event Out G (249) <i>Enb.H</i> Profile Event Out H (250) <i>FUn</i> Function Key (1001) <i>L9C</i> Logic (239) <i>tPr</i> Timer (244) <i>uRr</i> Variable (245)	None	3508 [offset 70]	0x7D (125) 1 to 24 5	- - - -	25005	uint RWES
Si.E	Si.E Math (1 to 24) Source Instance E Set the instance of the function selected above.	1 to 250	1	3518 [offset 70]	0x7D (125) 1 to 24 0xA (10)	- - - -	25010	uint RWES
SZ.E	SZ.E Math (1 to 24) Source Zone E Set the zone of the function selected above.	0 to 24	0	3528 [offset 70]	0x7D (125) 1 to 24 0xF (15)	- - - -	25015	uint RWES
SLo	SLo Math (1 to 24) Scale Low If Math function is set to Process Scale, this will scale Source A low value to Range Low setting.	-1,999.000 to 9,999.000	0.0	3546 [offset 70]	0x7D (125) 1 to 24 0x18 (24)	70	25024	float RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Param-eter ID	Data Type and Access **
<i>S.h</i> , S.hi	Math (1 to 24) Scale High If Math function is set to Process Scale, this will scale Source A high value to Range High setting.	-1,999.000 to 9,999.000	1.0	3548 [offset 70]	0x7D (125) 1 to 24 0x19 (25)	71	25025	float RWES
<i>Unit</i> , Unit	Math (1 to 24) Units Set units for Source.	<i>Src</i> Source (1539) <i>none</i> None (61) <i>Atp</i> Absolute Temperature (1540) <i>rtp</i> Relative Temperature (1541) <i>Plur</i> Power (73) <i>Pro</i> Process (75) <i>rh</i> Relative Humidity (1538)	Source	3562 [offset 70]	0x7D (125) 1 to 24 0x20 (32)	- - - -	25032	uint RWES
<i>r.lo</i> , r.lo	Math (1 to 24) Range Low If Math function is set to Process Scale, this will output Source A Scale Low value to Range Low setting.	-1,999.000 to 9,999.000	0.0	3550 [offset 70]	0x7D (125) 1 to 24 0x1A (26)	72	25026	float RWES
<i>r.hi</i> , r.hi	Math (1 to 24) Range High If Math function is set to Process Scale, this will output Source A Scale High value to Range High setting.	-1,999.000 to 9,999.000	1.0	3552 [offset 70]	0x7D (125) 1 to 24 0x1B (27)	73	25027	float RWES
<i>P.un</i> , P.unt	Math (1 to 24) Pressure Units If Math function is set for Pressure to Altitude units, set units of measure for conversion.	<i>PS</i> , Pressure Units (1671) <i>PAsc</i> Pascal (1674) <i>Atm</i> Atmosphere (1675) <i>mb</i> mbar (1672) <i>Torr</i> Torr (1673)	Pressure Units	3558 [offset 70]	0x7D (125) 1 to 24 0x1E (30)	- - - -	25030	uint RWES

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>Runt</i> A.un	Math (1 to 24) Altitude Units If Math function is set for Pressure to Altitude units, set units of measure for conversion.	<i>HfE</i> Kilofeet (1671) <i>Ft</i> Feet (1674)	Kilofeet	3560 [offset 70]	0x7D (125) 1 to 24 0x1F (31)	- - -	25031	uint RWES
<i>FiL</i> FiL	Math (1 to 24) Filter Filtering smooths out the output signal of this function block. Increase the time to increase filtering.	0.0 to 60.0 seconds	0.0	3554 [offset 70]	0x7D (125) 1 to 24 0x1C (28)	- - -	25028	float RWES

uAr
SET

Variable Menu

<i>tyPE</i>	Variable (1 to 24) Data Type Set the variable's data type.	<i>AnL9</i> Analog (1215) <i>d19</i> Digital (1220)	Analog	4800 [offset 20]	0x66 (102) 1 to 24 1	210	2001	uint RWES
<i>Un it</i> Unit	Variable (1 to 24) Units Set the variable's units. Note: Units are always in degrees F when used for temperature	<i>AEP</i> Absolute Temperature (1540) <i>rEP</i> Relative Temperature (1541) <i>Pwr</i> Power (73) <i>Pro</i> Process (75) <i>rh</i> Relative Humidity (1538) <i>none</i> None (61)	Absolute Temperature	4812 [offset 20]	0x66 (102) 1 to 24 7	- - -	2007	uint RWES
<i>d19</i> dig	Variable (1 to 24) Digital Set the variable's value.	<i>off</i> Off (62) <i>on</i> On (63)	Off	4802 [offset 20]	0x66 (102) 1 to 24 2	211	2002	uint RWES
<i>AnL9</i> AnLg	Variable (1 to 24) Analog Set the variable's value.	-1,999.000 to 9,999.000	0.0	4804 [offset 20]	0x66 (102) 1 to 24 3	212	2003	float RWES
No Dis- play	Variable (1 to 24) Output Value	Off (62) On (63) -1,999.000 to 9,999.000	- - -	13026 [offset 20]	0x66 (102) 1 to 24 4	- - -	2004	float R

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

** R: Read, W: Write, E: EEPROM, S: User Set

RM Scanner Module • Setup Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
9L6L SET Global Menu								
C_F	Global Display Units Select which scale to use for temperature.	F °F (30) C °C (15)	°F	368	0x67 (103) 1 5	51	3005	uint RWES
AC.LF	Global AC Line Frequency Set the frequency to the applied ac line power source.	50 50 Hz (3) 60 60 Hz (4)	60 Hz	- - - -	0x65 (101) 1 0x22(34)	- - - -	1034	uint RWES
P7RH MAX	Global Maximum Display Value Allows ranges to be opened up to display full values. Prior to firmware revision 9.0, ranges were clamped to accommodate the seven segment LED display of the RUI. Typically used with external display devices/software like HMs and SpecView.	Floating Point [-3.4E+38 to 3.4E+38] Unsigned integer [0 to 65,535]	9999.0	- - - -	0x67 (103) 1 0x2D (45)	- - - -	3045	float RW
P7rn Min	Global Minimum Display Value Allows ranges to be opened up to display full values. Prior to firmware revision 9.0, ranges were clamped to accommodate the seven segment LED display of the RUI. Typically used with external display devices/software like HMs and SpecView.	Floating Point [-3.4E+38 to 3.4E+38] Unsigned integer [0 to 65,535]	-1,999.0	- - - -	0x67 (103) 1 0x2C (44)	- - - -	3044	float RW
* These parameters/prompts are available in these menus with firmware revisions 6.0 and above. ** R: Read, W: Write, E: EEPROM, S: User Set								

RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
dPrS dPrS	<i>Global Display Pairs</i> Defines the number of Display Pairs.	1 to 15	1	- - - -	0x67 (103) 1 0x1C (28)	- - - -	3028	uint RWES
USr.S USr.S	<i>Global Save Settings As</i> Save all of this controller's settings to the selected set that have a Data Type of RWES	<i>SEL 1</i> User Set 1 (101) <i>none</i> None (61) * Starting with firmware release 6, there is only one user set.	None	26	0x65 (101) 1 0x0E (14)	59	1014	uint RWE
USr.r USr.r	<i>Global Restore Settings From</i> Replace all of this controller's settings with another set.	<i>none</i> None (61) <i>SEL 1</i> User Set 1 (101) <i>FCEY</i> Factory (31) * Starting with firmware release 6, there is only one user set.	None	24	0x65 (101) 1 0xD (13)	58	1013	uint RWE

CoP7

SET

Communications Menu

bAud bAUD	<i>Communications Baud Rate</i> Set the speed of this controller's communications to match the speed of the serial network.	<i>9600</i> 9,600 (188) <i>192</i> 19,200 (189) <i>384</i> 38,400 (190)	9,600	3464	0x96 (150) 1 3	- - - -	17002	uint RWE
Par Par	<i>Communications Parity</i> Set the parity of this controller to match the parity of the serial network. Note: This applies if 13th digit in part number is equal to one.	<i>none</i> None (61) <i>EuEn</i> Even (191) <i>odd</i> Odd (192)	None	3466	0x96 (150) 1 4	- - - -	17003	uint RWE
M.hL M.hL	<i>Communications Modbus Word Order</i> Select the word order of the two 16-bit words in the floating-point values.	<i>hLo</i> Word High Low (1330) <i>Loh</i> Word Low High (1331)	Low High	3468	0x96 (150) 1 5	- - - -	17043	uint RWE

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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RM Scanner Module • Setup Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP - Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
<i>C_F</i> C_F	Communications Display Units Select which scale to use for temperature passed when using Modbus.	<i>F</i> °F (30) <i>C</i> °C (15)	°F	3470	0x96 (150) 1 6	199	17050	uint RWE
<i>nVS</i> nV.S	Communications (1) Non-volatile Save If set to Yes all values written to the control will be saved in EEPROM. Note: Any value that is changed from the RUI or over a communications port will initiate a write to the EEPROM. Life of EEPROM is approximately one million writes.	<i>YES</i> Yes (106) <i>NO</i> No (59)	Yes	3474	0x96 (150) 1 8	112	17051	uint RWE

* These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

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Chapter 5: Factory Pages

Control Module Factory Page Parameters

To navigate to the Factory Page using the RUI, follow the steps below:

1. From the Home Page, press and hold both the Advance  and Infinity  keys for six seconds.
2. Press the Up  or Down  key to view available menus.
3. Press the Advance Key  to enter the menu of choice.
4. If a submenu exists (more than one instance), press the Up  or Down  key to select and then press the Advance Key  to enter.
5. Press the Up  or Down  key to move through available menu prompts.
6. Press the Infinity Key  to move backwards through the levels: parameter to submenu, submenu to menu, menu to Home Page.
7. Press and hold the Infinity Key  for two seconds to return to the Home Page.

On the following pages, top level menus are identified with a yellow background color.

Note:

Some of these menus and parameters may not appear, depending on the controller's options. See model number information in the Appendix for more information. If there is only one instance of a menu, no submenus will appear.

Note:

Some of the listed parameters may not be visible. Parameter visibility is dependent upon controller part number.

CUS _E	ULoC	CAL
FCE _Y Custom Setup Menu	FCE _Y Security Setting Menu	FCE _Y Calibration Menu
CUS _E Custom Setup (1 to 30)	LoC Security Setting	ACE Calibration (1 to 16)
PAR _r Parameter	Code Public Key	Pnu Electrical Measurement
i _d Instance ID	PASS Password	EL ₁₀ Electrical Input Offset
LoC	d ₁ R9	EL ₁₅ Electrical Input Slope
FCE _Y Security Setting Menu	FCE _Y Diagnostics Menu	
LoC Security Setting	d ₁ R9 Diagnostics	
LoCo Operations Page	Pn Part Number	
PASE Password	rEu Software Revision	
rLoC Read Lock	Sbd Software Build	
SLoC Write Security	Number	
LoCL Locked Access Level	Sn Serial Number	
roll Rolling Password	DATE Date of Manufacture	
PAS _u User Password		
PASA Administrator Password		

RMS Module • Factory Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
CUST FCRY								
Custom Setup Menu								
PRr Par	<p>Custom Menu Parameter 1 to 30 Select the parameters that will appear in the Home Page when using the RUI.</p> <p>The Parameter 1 value will appear in the upper display of the Home Page. It cannot be changed with the Up and Down Keys in the Home Page.</p> <p>The Parameter 2 value will appear in the lower display in the Home Page. It can be changed with the Up and Down Keys, if the parameter is a writable one.</p> <p>Scroll through the other Home Page parameters with the Advance Key .</p>	<p><i>nonE</i> None (61) <i>Pro</i> Process (75) <i>.CR</i> Input Calibration Offset (1196) <i>C_F</i> Display Units (156) <i>USr.r</i> User Restore Set (227) <i>ALo</i> Low Set point (42) <i>Rhi</i> High Set point (78) <i>Rhy</i> Hysteresis (97) <i>CUST</i> Custom Menu (180)</p>	- - -	- - -	- - -	- - -	14005	uint RWES
iid	<p>Custom Setup (1 to 20) Instance ID Select the instance of the parameter selected above to be displayed.</p>	1 to 24	- - -	- - -	- - -	- - -	14003	uint RWES
LoC FCRY								
Security Setting Menu								
LoCo	<p>Security Setting Operations Page Use to change the required security level clearance required to gain access to the Operations Page.</p>	1 to 3	2	- - -	- - -	- - -	- - -	unit RWE

** R: Read, W: Write, E: EEPROM, S: User Set

RMS Module • Factory Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
PAS.E	Security Setting Password Enable Turn Password Enable ON if a Password access feature is desired. This is in addition to Read Lock or Write Security..	<small>OFF Off</small> <small>ON On</small>	Off	- - -	- - -	- - -	- - -	- - -
rLoC	Security Setting Read Lock Set the read security clearance level. The user can access the selected level and all lower levels. Applies regardless of Password Enable setting. Set the Read Lock clearance level. The user can have read access to the selected level and all lower levels. If the Write Security level is higher than the Read Lock, the Read Lock level takes priority.	1 to 5	5	- - -	- - -	- - -	- - -	uint RWE
SLoC	Security Setting Write Security Set the write security clearance level. The user can access the selected level and all lower levels. Applies regardless of Password Enable setting. Set the Write Security clearance level. The user can have write access to the selected level and all lower levels. If the Write Security level is higher than the Read Lock, the Read Lock level takes priority.	0 to 5	5	- - -	- - -	- - -	- - -	uint RWE

** R: Read, W: Write, E: EEPROM, S: User Set

RMS Module • Factory Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
<i>LoCL</i> LoC.L	Security Setting Locked Access Level Determines user level menu visibility when Password is enabled. See Features section under Password Security. This setting is in addition to Read Lock and Write Security. Consider using only Locked Access Level and Set Read Lock and Write Security to 5.	1 to 5	5	- - - -	- - - -	- - - -	- - - -	- - - -
<i>roLL</i> roll	Security Setting Rolling Password Applies if Password En- able is ON. When power is cycled a new Public Key will be displayed.	<i>oFF</i> Off <i>on</i> On	Off	- - - -	- - - -	- - - -	- - - -	- - - -
<i>PAS.u</i> PAS.u	Security Setting User Password Applies if Password En- able is ON. Used to ac- quire access to menus made available through the Locked Access Level setting. Do not forget the password as it is required to change Locked Ac- cess Level, Read Lock or Write Security.	10 to 999	63	- - - -	- - - -	- - - -	- - - -	- - - -
<i>PAS.A</i> PAS.A	Security Setting Administrator Password Applies if Password En- able is ON. Used to ac- quire access to menus made available through the Locked Access Level setting. Do not forget the password as it is required to change Locked Access Level, Read Lock, Write Security and the ability to change the Passwords.	10 to 999	156	- - - -	- - - -	- - - -	- - - -	- - - -

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RMS Module • Factory Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro-fibus Index	Parameter ID	Data Type and Access **
No Display	Security Setting Locked State Current level of security	Lock (228) User (1684) Admin (1685)	- - - - -	- - - - -	- - - - -	- - - - -	3023	uint R
<i>ULoC FCtY</i>								
Security Setting Menu								
<i>Code</i> CodE	Security Setting Public Key If Rolling Password is turned ON, generates a random number when power is cycled. If Rolling Password is OFF, a fixed number will be displayed. The Public Key is only required if the assigned Password is unknown. Provide the key to the OEM or technical support to gain access.	Customer Specific	0	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
<i>PASS</i> PASS	Security Setting Password Applies if Password Enable is set to ON. Enter the 4-digit assigned password. If unknown, contact your supervisor, the OEM or technical support to gain access.	-1999 to 9999	0	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
<i>d ,R9 FCtY</i>								
Diagnostics Menu								
<i>Pn</i> Pn	Diagnostics Menu Part Number Display this controller's part number.	24	- - - - -	- - - - -	0x65 (101) 1 9	90	1009	int RWE
<i>rEv</i> rEv	Diagnostics Menu Software Revision Display this controller's firmware revision number.	5	- - - - -	4	0x65 (101) 1 to 5 0x11 (17)	91	1017	int R
<i>S.bLd</i> S.bLd	Diagnostics Menu Software Build Number Display the firmware build number.	0 to 2,147,483,647	- - - - -	8	0x65 (101) 1 to 5 5	- - - - -	1005	float R
** R: Read, W: Write, E: EEPROM, S: User Set								

RMS Module • Factory Page

Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
<i>Sn</i> Sn	Diagnostics Menu Serial Number Display the serial number.	0 to 2,147,483,647	- - - -	12	0x65 (101) 1 7	- - - -	1007	float RWE
<i>dAtE</i> dAtE	Diagnostics Menu Date of Manufacture Display the date code.	0 to 2,147,483,647	- - - -	14	0x65 (101) 1 8	- - - -	1008	float RWE
No Dis- play	Diagnostics Menu Hardware ID Read the hardware ID.	23 or 116	23	0	0x65 (101) 1 1	- - - -	1001	signed 32-bit R
No Dis- play	<i>Diagnostics Menu</i> Device Name Read the device name.	EZ-ZONE RM	- - - -	- - - -	0x65 (101) 1 0x0B (11)	- - - -	1011	string R
No Dis- play	<i>Diagnostics Menu</i> Device Status Return hardware status Fail means return to factory.	OK (138) Fail (32)	- - - -	30	0x65 (101) 1 0x10 (16)	- - - -	1016	uint R

CAL *FCRY*

Calibration Menu

<i>Mv</i> Mv	<i>Calibration Menu (1 to 16)</i> Electrical Measurement Read the raw electrical value for this input in the units corresponding to the Sensor Type (Setup Page, Analog Input Menu) setting.	-3.4e38 to 3.4e38		420 [offset 90]	0x68 (104) 1 to 16 0x15 (21)	- - - -	4021	float R
<i>EL.i0</i> ELi.o	<i>Calibration Menu (1 to 16)</i> Electrical Input Offset Change this value to calibrate the low end of the input range.	-1,999.000 to 9,999.000	0.0	398 [offset 90]	0x68 (104) 1 to 16 0xA (10)	- - - -	4010	float RWES
<i>EL.i5</i> ELi.S	<i>Calibration Menu (1 to 16)</i> Electrical Input Slope Adjust this value to calibrate the slope of the input value.	-1,999.000 to 9,999.000	1.0	400 [offset 90]	0x68 (104) 1 to 16 0xB (11)	- - - -	4011	float RWES

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RMS Module • Factory Page								
Display	Parameter Name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Pro- fibus Index	Param- eter ID	Data Type and Access **
<i>ELo.o</i> ELo.o	<i>Calibration Menu (1 to 3 and 7 to 9)</i> Electrical Output Offset Change this value to calibrate the low end of the output range.	-1,999.000 to 9,999.000	0.0	17554 [offset 600]	0x76 (118) 1 to 4 5	- - - -	18005	float RWES
<i>ELo.S</i> ELo.S	<i>Calibration Menu (1 to 3 and 7 to 9)</i> Electrical Output Slope Adjust this value to calibrate the slope of the output value.	-1,999.000 to 9,999.000	1.0	17556 [offset 90]	0x76 (118) 1 to 4 6	- - - -	18006	float RWES

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Chapter 6: Features

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Saving and Restoring Settings Using an RUI

Recording setup and operations parameter settings for future reference is very important. If you unintentionally change these, you will need to program the correct settings back into the controller to return the equipment to operational condition.

After you program the controller and verify proper operation, use Save Settings As [U5r.5](#) (Setup Page, Global Menu) to save the settings into either of two files in a special section of memory.

Note:

Starting with firmware release 6, there is only one user set.

If the settings in the controller are altered and you want to return the controller to the saved values, use Restore Settings From [U5r.r](#) (Setup Page, Global Menu) to recall the previously saved settings. A digital input or the Function Key via the Action Block can also be configured to restore parameters.

CAUTION: 

If an Action is programmed for User Set Restore, the operator may select Factory Restore and the Digital Input or Function Key may no longer be programmed for User Setting Restore.

Note:

Restoring to factory defaults will overwrite the entirety of the module memory; this would include any customized assemblies used with any of the available communications protocols.

Note:

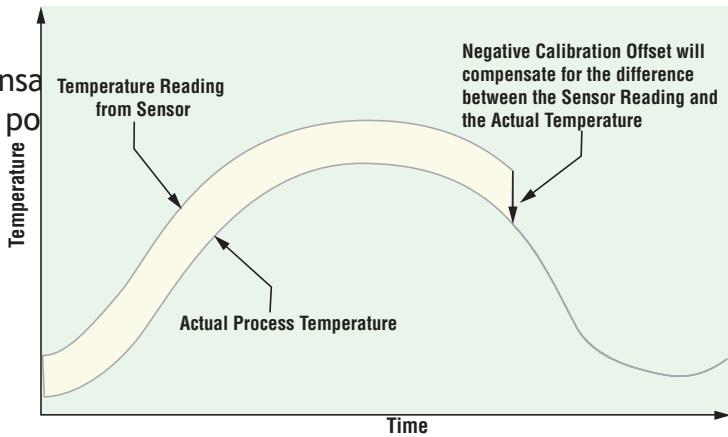
Only perform the above procedure when you are sure that all the correct settings are programmed into the controller. Saving the settings overwrites any previously saved collection of settings. Be sure to document all the controller settings.

Inputs

Calibration Offset

Calibration offset allows a device to compensate other factors that affect the input value. A positive offset increases the input value. A negative offset decreases the input value.

The input offset value can be viewed or changed with Calibration Offset [.CRA](#) (Operations Page, Analog Input Menu).



Calibration

Before performing any calibration procedure, verify that the displayed readings are not within published specifications by inputting a known value from a precision source to the analog input. Next, subtract the displayed value with the known value and compare this difference to the published accuracy range specification for that type of input.

Use of the Calibration Offset [.CRA](#) parameter found in the Operations Page [oPER](#), Analog Input Menu [A](#), shifts the readings across the entire displayed range by the offset value. Use this parameter to compensate for sensor error or sensor placement error. Typically this value is set to zero.

Equipment required while performing calibration:

Obtain a precision source for millivolts, volts, milliamperes or resistance depending on the sensor type to be calibrated. Use copper wire only to connect the precision source to the controller's input. Keep leads between the precision source and controller as short as possible to minimize error. In addition, a precision volt/ohm meter capable of reading values to 4 decimal places or better is recommended. Prior to calibration, connect this volt/ohm meter to the precision source to verify accuracy.

Actual input values do NOT have to be exactly the recommended values, but it IS critical that the actual value of the signal connected to the controller be accurately known to at least four digits.

Calibration of Analog Inputs:

To calibrate an analog input, you will need to provide a source of two electrical signals or resistance values near the extremes of the range that the application is likely to utilize. See recommended values below:

Sensor Type	Low Source	High Source
thermocouple	0.000 mV	50.000 mV
millivolts	0.000 mV	50.000 mV
volts	0.000V	10.000V
millamps	0.000 mA	20.000 mA
100 Ω RTD	50.00 Ω	350.00 Ω
1,000 Ω RTD	500.00 Ω	3,500.00 Ω
Thermistor 5K	50.00 Ω	5000.00 Ω
Thermistor 10K	50.00 Ω	10000.00 Ω
Thermistor 20K	50.00 Ω	20000.00 Ω
Thermistor 40K	50.00 Ω	40000.00 Ω

Note:

The user may only calibrate one sensor type. If the calibrator interferes with open thermocouple detection, set Sensor Type **SEN** in Setup Page **SEL**, Analog Input Menu **A**, to millivolt **MV** instead of Thermocouple **TC** to avoid interference between the calibrator and open thermocouple detect circuit for the duration of the calibration process. Be sure to set sensor type back to the thermocouple type utilized.

1. Disconnect the sensor from the controller.
2. Record the Calibration Offset **.CR** parameter value in the Operations Page **OPR**, Analog Input Menu **A**, then set value to zero.
3. Wire the precision source to the appropriate controller input terminals to be calibrated. Do not have any other wires connected to the input terminals. Please refer to the Install and Wiring section of this manual for the appropriate connections.
4. Ensure the controller sensor type is programmed to the appropriate Sensor Type **SEN** to be utilized in the Setup Page **SEL**, Analog Input Menu **A**.
5. Enter Factory Page **FCTY**, Calibration Menu **CAL** via RUI or EZ-ZONE Configurator Software.
6. Select the Calibration **CAL** input instance to be calibrated. This corresponds to the analog input to be calibrated.

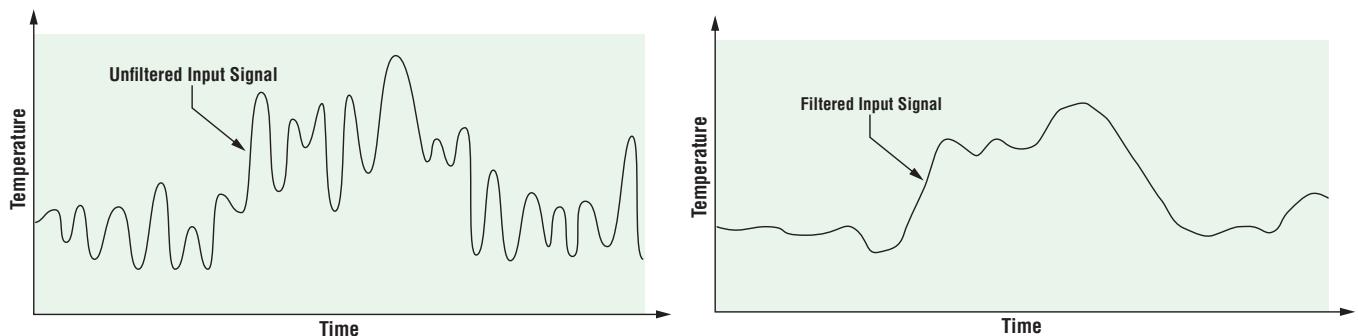
7. Set Electrical Input Slope $EL_{1.5}$ to 1.000 and Electrical Input Offset $EL_{1.0}$ to 0.000 (this will cancel any prior user calibration values)
8. Input a Precision Source Low value. Read Electrical Measurement value PL_u of controller via EZ-Configurator or RUI. This will be referred to as Electrical Measured Low. Record low value _____
9. Input a Precision Source High value.
10. Read Electrical Measurement value PH_u of controller via EZ-Configurator or RUI. This will be referred to as Electrical Measured High. Record high value _____
11. Calculated Electrical Input Slope = (Precision High - Precision Low) / (Electrical Measured High - Electrical Measured Low) Calculated Slope value _____
12. Calculated Electrical Input Offset = Precision Low - (Electrical Input Slope * Measured Low) Calculated Offset value _____
13. Enter the calculated Electrical Input Slope $EL_{1.5}$ and Electrical Input Offset $EL_{1.0}$ into the controller.
14. Exit calibration menu.
15. Validate calibration process by utilizing a calibrator to the analog input.
16. Enter calibration offset as recorded in step 2 if required to compensate for sensor error.

Setting Electrical Input Slope $EL_{1.5}$ to 1.000 and Electrical Input Offset $EL_{1.0}$ to 0.000, restores factory calibration as shipped from factory.

Filter Time Constant

Filtering smooths an input signal by applying a first-order filter time constant to the signal. Filtering the displayed value makes it easier to monitor. Filtering the signal may improve the performance of PID control in a noisy or very dynamic system.

Adjust the filter time interval with Filter Time $F_{1,L}$ (Setup Page, Analog Input Menu). Example: With a filter value of 0.5 seconds, if the process input value instantly changes from 0 to 100 and remained at 100, the display will indicate 100 after five time constants of the filter value or 2.5 seconds.



Sensor Selection

You need to configure the controller to match the input device, which is normally a thermocouple, RTD or process transmitter. Select the sensor type with Sensor Type SE_n (Setup Page, Analog Input Menu).

Scale High and Scale Low

When an analog input is selected as process voltage or process current input, you must choose the value of voltage or current to be the low and high ends. For example, when using a 4 to

20 mA input, the scale low value would be 4.00 mA and the scale high value would be 20.00 mA. Commonly used scale ranges are: 0 to 20 mA, 4 to 20 mA, 0 to 5V, 1 to 5V and 0 to 10V.

You can create a scale range representing other units for special applications. You can reverse scales from high values to low values for analog input signals that have a reversed action. For example, if 50 psi causes a 4 mA signal and 10 psi causes a 20 mA signal.

Scale low and high low values do not have to match the bounds of the measurement range. These along with range low and high provide for process scaling and can include values not measurable by the controller. Regardless of scaling values, the measured value will be constrained by the electrical measurements of the hardware.

Select the low and high values with Scale Low *S.Lo* and Scale High *S.hi*. Select the displayed range with Range Low *r.Lo* and Range High *r.hi* (Setup Page, Analog Input Menu).

Range High and Range Low

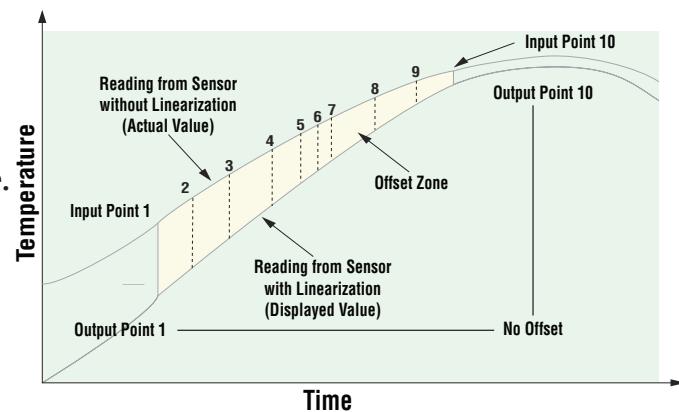
With a process input, you must choose a value to represent the low and high ends of the current or voltage range. Choosing these values allows the controller's display to be scaled into the actual working units of measurement. For example, the analog input from a humidity transmitter could represent 0 to 100 percent relative humidity as a process signal of 4 to 20 mA. Low scale would be set to 0 to represent 4 mA and high scale set to 100 to represent 20 mA. The indication on the display would then represent percent humidity and range from 0 to 100 percent with an input of 4 to 20 mA.

Select the low and high values with Range Low *r.Lo* and Range High *r.hi* (Setup Page, Analog Input Menu).

10 Point Linearization

The linearization function allows a user to re-linearize a value read from an analog input. There are 10 data points used to compensate for differences between the sensor value read (input point) and the desired value (output point). Multiple data points enable compensation for non-linear differences between the sensor readings and target process values over the thermal or process system operating range. Sensor reading differences can be caused by sensor placement, tolerances, an inaccurate sensor or lead resistance.

The user specifies the unit of measurement and then each data point by entering an input point value and a corresponding output point value. Each data point must be incrementally higher than the previous point. The linearization function will interpolate data points linearly in between specified data points.



Alarms

Alarms are activated when the output level, process value or temperature leaves a defined range. A user can configure how and when an alarm is triggered, what action it takes and whether it turns off automatically when the alarm condition is over. Configure alarm outputs in the Setup Page before setting alarm set points. Alarms do not have to be assigned to an output. Alarms can be monitored and controlled through the front panel or by using software.

Process Alarms

A process alarm uses one or two absolute set points to define an alarm condition. Select the type with Type **A.EY** (Setup Page, Alarm Menu).

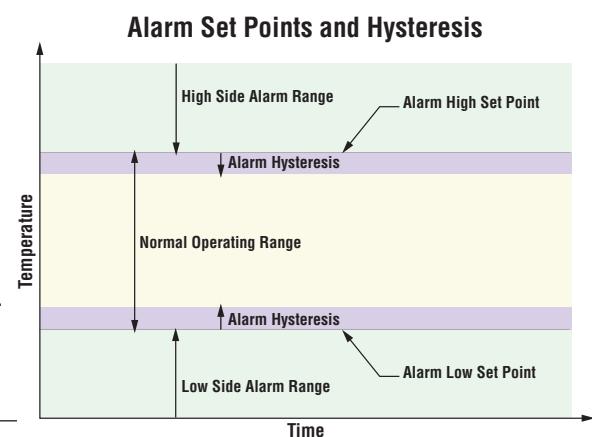
Alarm Set Points

The high set point defines the process value or temperature that will trigger a high side alarm. The low set point defines the temperature that will trigger a low side alarm. View or change alarm set points with Alarm Low **ALo** and High Set Points **Ah** (Operations Page, Alarm Menu).

Alarm Hysteresis

An alarm state is triggered when the process value reaches the alarm high or alarm low set point. Alarm hysteresis defines how far the process must return into the normal operating range before the alarm can be cleared.

Alarm hysteresis is a zone inside each alarm set point. This zone is defined by adding the hysteresis value to the alarm low set point or subtracting the hysteresis value from the alarm high set point. View or change alarm hysteresis with Hysteresis **A.hY** (Setup Page, Alarm Menu).



Alarm Latching

A latched alarm will remain active after the alarm condition has passed. It can only be deactivated by the user and only when the alarm condition no longer exists.

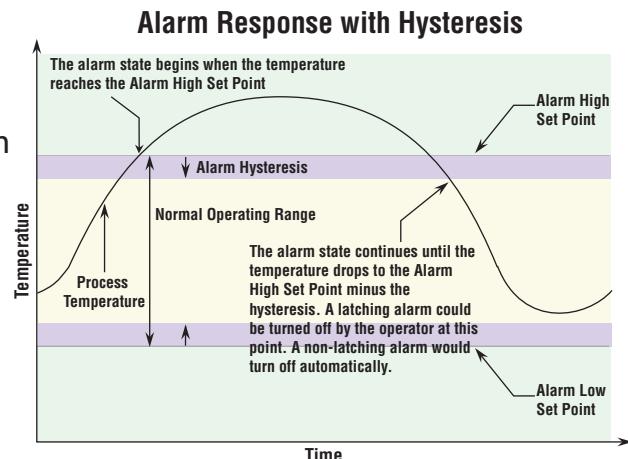
If using an RUI an active message, such as an alarm message, will cause the display to toggle between the normal settings and the active message in the upper display and **AETEn** in the lower display.

To clear a latched alarm:

1. Push the Advance Key to display **19rr** in the upper display and the message source in the lower display.
2. Use the Up or Down keys to scroll through possible responses, such as Clear **ELr** or Silence **5.L**.
3. Push the Advance or Infinity key to execute the action.

Without an RUI, a latched alarm can be reset by cycling power to the module or configuring

an Action function within the control to perform a reset. Do this by setting the Action Function to alarm and trigger the Action to occur through Source Function A. An alarm that is not latched (self-clearing) will deactivate automatically when the alarm condition has passed. Turn Latching **ALR** on or off via the Setup Page, Alarm Menu.



Alarm Silencing

If silencing is on the operator can disable the alarm output while the controller is in an alarm state. The process value or temperature has to enter the normal operating range beyond the hysteresis zone to activate the alarm output function again.

If using an RUI an active message, such as an alarm message, will cause the display to toggle between the normal settings and the active message in the upper display and *A_lrm* in the lower display.

To silence an alarm:

1. Push the Advance Key  to display *BnR* in the upper display and the message source in the lower display.
2. Use the Up  and Down  keys to scroll through possible responses, such as Clear *CLr* or Silence *S_{il}*.
3. Push the Advance  or Infinity  key to execute the action.

Without an RUI, silencing aa alarm can be accomplished by configuring an Action function within the control to silence the alarm. Do this by setting the Action Function to Silence and trigger the Action to occur through Source Function A. Turn Silencing *AS* on or off via the Setup Page, Alarm Menu.

Alarm Blocking

Blocking allows a system to warm up after it has been started up. With blocking on, an alarm is not triggered when the process temperature is initially lower than the low set point or higher than the high set point. The process temperature has to enter the normal operating range beyond the hysteresis zone to activate the alarm function.

Turn Blocking *ABL* on or off via the Setup Page, Alarm Menu.

Using Password Security

It is sometimes desirable to apply a higher level of security to the control where a limited number of menus are visible and not providing access to others without a security password. Without the appropriate password those menus will remain inaccessible. If Password Enabled *PAS.E* in the Factory Page under the *LoC* Menu is set to on, an overriding Password Security will be in effect. When in effect, the only Pages that a User without a password has visibility to are defined in the Locked Access Level *LoCL* prompt. On the other hand, a User with a password would have visibility restricted by the Read Lockout Security *rLoC*. As an example, with Password Enabled and the Locked Access Level *LoCL* set to 1 and *rLoC* is set to 3, the available Pages for a User without a password would be limited to the Home and Factory Pages (locked level 1). If the User password is entered all pages would be accessible with the exception of the Setup Page as defined by level 3 access.

How to Enable Password Security

Go to the Factory Page by holding down the Infinity  key and the Advance  key for approximately six seconds. Once there, push the Down  key one time to get to the *LoC* menu. Again push the Advance  key until the Password Enabled *PAS.E* prompt is visible. Lastly, push either the up or down key to turn it on. Once on, 4 new prompts will appear:

1. *LoCL*, Locked Access Level (1 to 5) corresponding to the lockout table above.
2. *rLoC*, Rolling Password will change the Customer Code every time power is cycled.
3. *PAS.u*, User Password which is needed for a User to acquire access to the control.

4. **PAS.R**, Administrator Password which is needed to acquire administrative access to the control.

The Administrator can either change the User and or the Administrator password or leave them in the default state. Once Password Security is enabled they will no longer be visible to anyone other than the Administrator. As can be seen in the formula that follows either the User or Administrator will need to know what those passwords are to acquire a higher level of access to the control. Back out of this menu by pushing the Infinity ☰ key. Once out of the menu, the Password Security will be enabled.

How to Acquire Access to the Control

To acquire access to any inaccessible Pages or Menus, go to the Factory Page and enter the **ULoE** menu. Once there follow the steps below:

Note:

If Password Security (Password Enabled **PASE** is On) is enabled the two prompts mentioned below in the first step will not be visible. If unknown, call the individual or company that originally setup the control.

1. Acquire either the User Password **PAS.U** or the Administrator Password **PAS.R**.
2. Push the Advance ☰ key one time where the Code **Code** prompt will be visible.

Note:

- a. If the the Rolling Password is off push the Advance key one more time where the Password **PASS** prompt will be displayed. Proceed to either step 7a or 8a. Pushing the Up ⬆ or Down ⬇ arrow keys enter either the User or Administrator Password. Once entered, push and hold the Infinity ☰ key for two seconds to return to the Home Page.
- b. If the Rolling Password **ROLL** was turned on proceed on through steps 3 - 9.
3. Assuming the Code **Code** prompt (Public Key) is still visible on the face of the control simply push the Advance key ☰ to proceed to the Password **PASS** prompt. If not, find your way back to the Factory Page as described above.
4. Execute the calculation defined below (7b or 8b) for either the User or Administrator.
5. Enter the result of the calculation in the upper display play by using the Up ⬆ and Down ⬇ arrow keys or use EZ-ZONE Configurator Software.
6. Exit the Factory Page by pushing and holding the Infinity ☰ key for two seconds.

Formulas used by the User and the Administrator to calculate the Password follows:

Passwords equal:

7. User
 - a. If Rolling Password **ROLL** is Off, Password **PASS** equals User Password **PAS.U**.
 - b. If Rolling Password **ROLL** is On, Password **PASS** equals: (**PAS.U** x code) Mod 929 + 70
8. Administrator
 - a. If Rolling Password **ROLL** is Off, Password **PASS** equals Administrator Password **PAS.R**.
 - b. If Rolling Password **ROLL** is On, Password **PASS** equals: (**PAS.R** x code) Mod 997 + 1000

Differences Between a User Without Password, User With Password and Administrator

- User **without** a password is restricted by the Locked Access Level *LoEL*.
- A User **with** a password is restricted by the Read Lockout Security *rLoL* never having access to the Lock Menu *LoL*.
- An Administrator is restricted according to the Read Lockout Security *rLoL* however, the Administrator has access to the Lock Menu where the Read Lockout can be changed.

Modbus - Using Programmable Memory Blocks

When using the Modbus protocol, the RM features a block of addresses that can be configured by the user to provide direct access to a list of 80 user configured parameters. This allows the user easy access to this customized list by reading from or writing to a contiguous block of registers.

To acquire a better understanding of the tables found in the back of this manual (See Appendix: [Modbus Programmable Memory Blocks](#)) please read through the text below which defines the column headers used.

Assembly Definition Addresses

- Fixed addresses used to define the parameter that will be stored in the "Working Addresses", which may also be referred to as a pointer. The value stored in these addresses will reflect (point to) the Modbus address of a parameter within the controller.

Assembly Working Addresses

- Fixed addresses directly related to their associated "Assembly Definition Addresses" (e.g., Assembly Working Addresses 200 & 201 will assume the parameter pointed to by Assembly Definition Addresses 40 & 41).

When the Modbus address of a target parameter is stored in an "Assembly Definition Address" its corresponding working address will return that parameter's actual value. If it's a writable parameter, writing to its working register will change the parameter's actual value.

As an example, Modbus register 410 contains the Analog Input 1 Process Value (See Operations Page, Analog Input Menu). If the value 410 is loaded into Assembly Definition Address 91, the process value sensed by analog input 1 will also be stored in Modbus registers 250 and 251. Note that by default all registers are set to Hardware ID.

The table (See Appendix: [Modbus Programmable Memory Blocks](#)) identified as "Assembly Definition Addresses and Assembly Working Addresses" reflects the assemblies and their associated addresses.

Software Configuration

To enable a user to configure the RM module using a personal computer (PC), Watlow has provided two different programs free of charge for your use.

- EZ-ZONE Configurator (text based), originally released with the EZ-ZONE family of controls.
- Composer (graphic based), released September 2014.

Note:

RM modules must have firmware revision 9.0 and above to be used with Composer software.

Both programs can be acquired directly from the DVD (Controller Support Tools) which shipped with the controller. Insert the DVD into your DVD drive and select and then install the preferred software. Alternatively, if you are viewing this document electronically and have a connection to the internet, simply click on the link below and type either Configurator or Composer into the Keyword field and then click Search to download the software free of charge. <http://www.watlow.com/literature/software.cfm>

EZ-ZONE Configurator Software

Installing the Software

To install the software:

1. Double-click the filename " EZCv5.exe".
2. After reading the license agreement click the **I accept the terms in the License Agreement** radio button and then click on the **Next** button to proceed.
3. Once the installation is complete, click the **Finish** button.

Starting EZ-ZONE Configurator software:

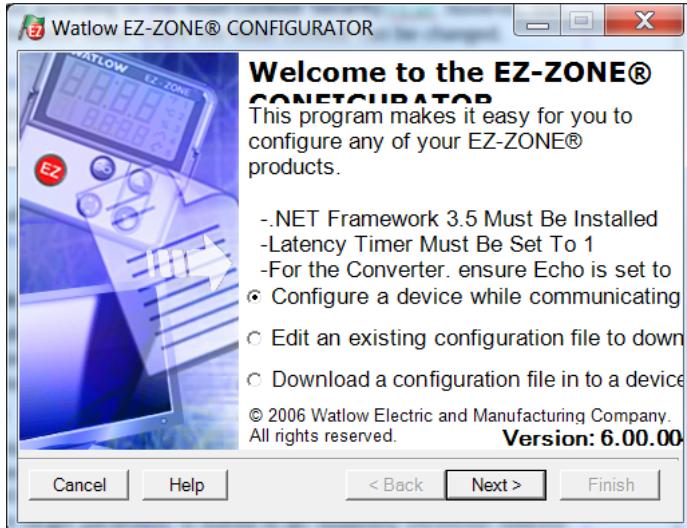
1. Double-click the EZ-ZONE Configurator icon on the desktop.

Or



2. On the task bar, click **Start** and type ez-zone configurator.exe in the search box and then press **Enter**.
3. Once the executable is found double-click the file to run.

The first screen that will appear is shown below.



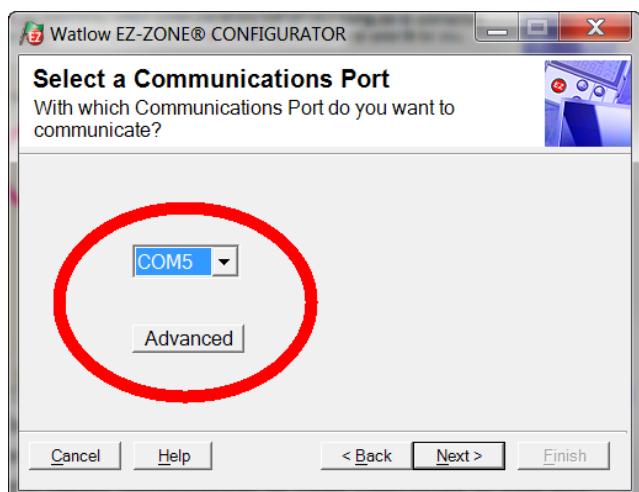
If the PC is already physically connected to the RMS module click the next button to go on-line.

Note:

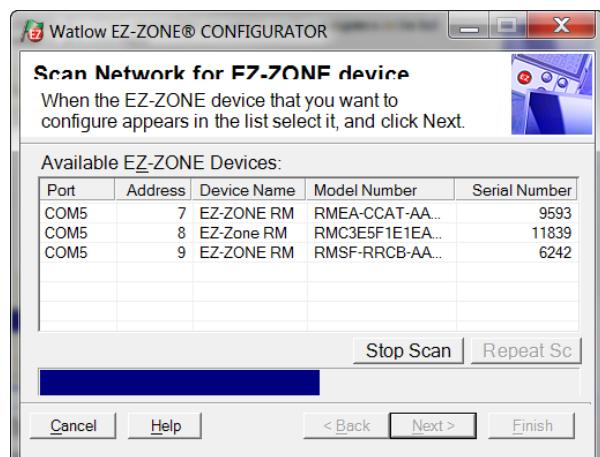
When establishing communications from PC to the RMS module an interface converter will be required. The Standard Bus network uses EIA-485 as the interface. Most PCs today would require a USB to EIA-485 converter. However, some PCs may still be equipped with EIA-232 ports, therefore an EIA-232 to EIA-485 converter would be required.

As can be seen in the above screen shot the software provides the user with the option of

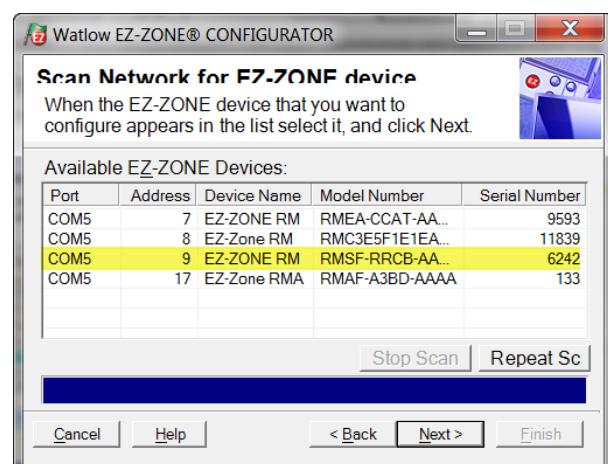
downloading a previously saved configuration as well as the ability to create a configuration off-line to download later. The screen shots that follow will take the user on-line. After clicking the next button above, it is necessary to define the communications port on the PC to use.



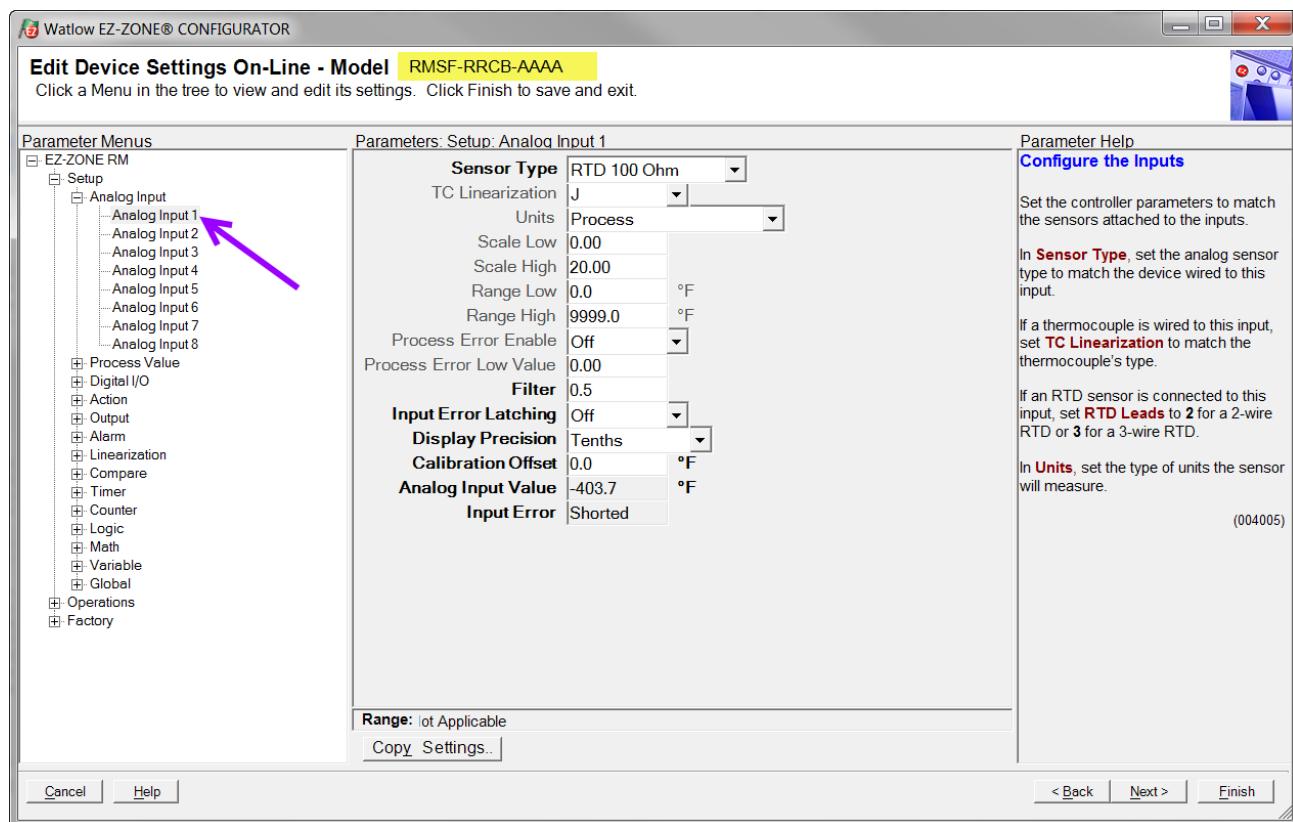
The available options allow the user to click on a drop down box to select a specific known communications port. Clicking on the Advanced button allows the user to define the number of EZ-ZONE devices to look for on the network. After clicking the Next button above, the software will then begin scanning for devices on the network as the screen shot below displays.



When complete the software will display all of the available devices found on the network as shown below.



In the screen shot above the RMS is shown highlighted to bring greater clarity to the module in focus. Any EZ-ZONE device on the network will appear in this window and would be available for the purpose of configuration or monitoring. After clicking on the module of choice simply click the next button once again. The screen below will appear next.



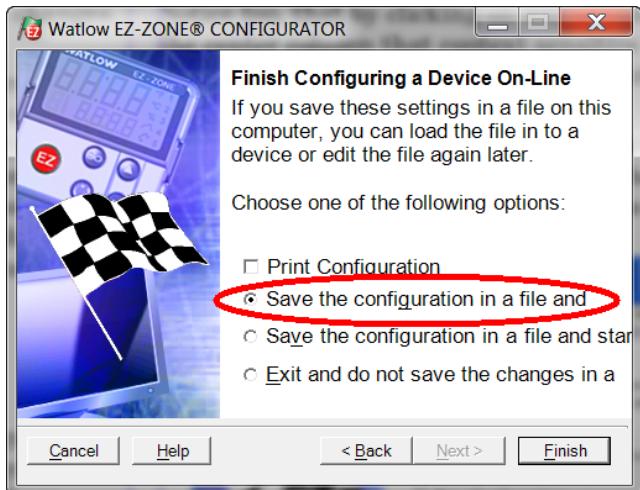
In the screen shot above notice that the device part number is clearly displayed at the top of the page (yellow highlight added for emphasis). When multiple EZ-ZONE devices are on the network it is important that the part number be noted prior to configuring so as to avoid making unwanted configuration changes to another module.

Looking closely at the left hand column (Parameter Menus) notice that it displays all of the available menus and associated parameters within this module. The menu structure as laid out within this software follows:

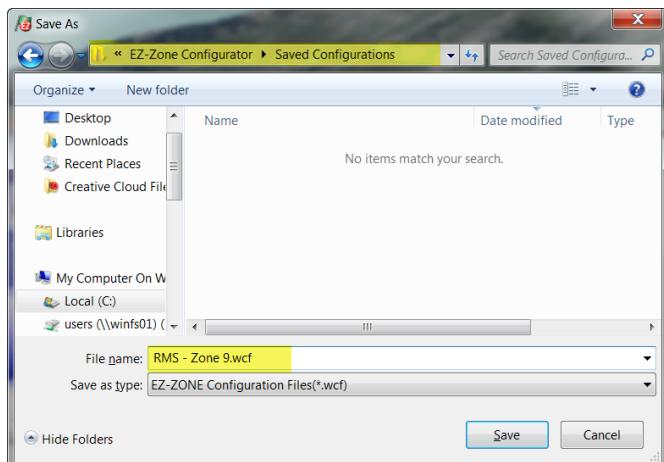
- Setup
- Operations
- Factory

Navigating from one menu to the next is easy and clearly visible. Simply slide the scroll bar up or down to display the menu and parameter of choice. As an alternative, clicking on the negative symbol next to Setup will collapse the Setup Menu where the Operations Menu will appear next and perhaps deliver more clarity for the area of focus by not displaying unwanted menus and parameters. Once the focus is brought to an individual parameter (single click of mouse) as is the case for Analog Input 1 in the left column, all that can be setup related to that parameter will appear in the center column. The grayed out fields in the center column simply mean that this does not apply for the type of device selected. As an example, notice that when Volts is selected, TC Linearization does not apply and is therefore grayed out. To speed up the process of configuration, notice that at the bottom of the center column there is an option to copy settings. If all Analog Inputs will be configured the same, click on "Copy Settings" where a copy from/to dialog box will appear allowing for quick duplication of all set-

tings. Notice too, that by clicking on any of those items in the center column that context sensitive help will appear for that particular item in the right hand column. Lastly, when the configuration is complete click the "Finish" button at the bottom right of the previous screen shot. The screen that follows this action can be seen below.



Although the RMS module now contains the configuration (because the previous discussion focused on doing the configuration on-line) it is suggested that after the configuration process is completed that the user save this file on the PC for future use. If for some reason someone inadvertently changed a setting without understanding the impact it would be easy and perhaps faster to download a saved configuration back to the control versus trying to figure out what was changed. Of course, there is an option to exit without saving a copy to the local hard drive. After selecting Save above, click the "Finish" button once again. The screen below will than appear.



When saving the configuration note the location where the file will be placed (Saved in) and enter the file name (File name) as well. The default path for saved files follows:

\My Documents\Watlow\EZ-ZONE CONFIGURATOR\Saved Configurations The user can save the file to any folder of choice.

Function Block Descriptions

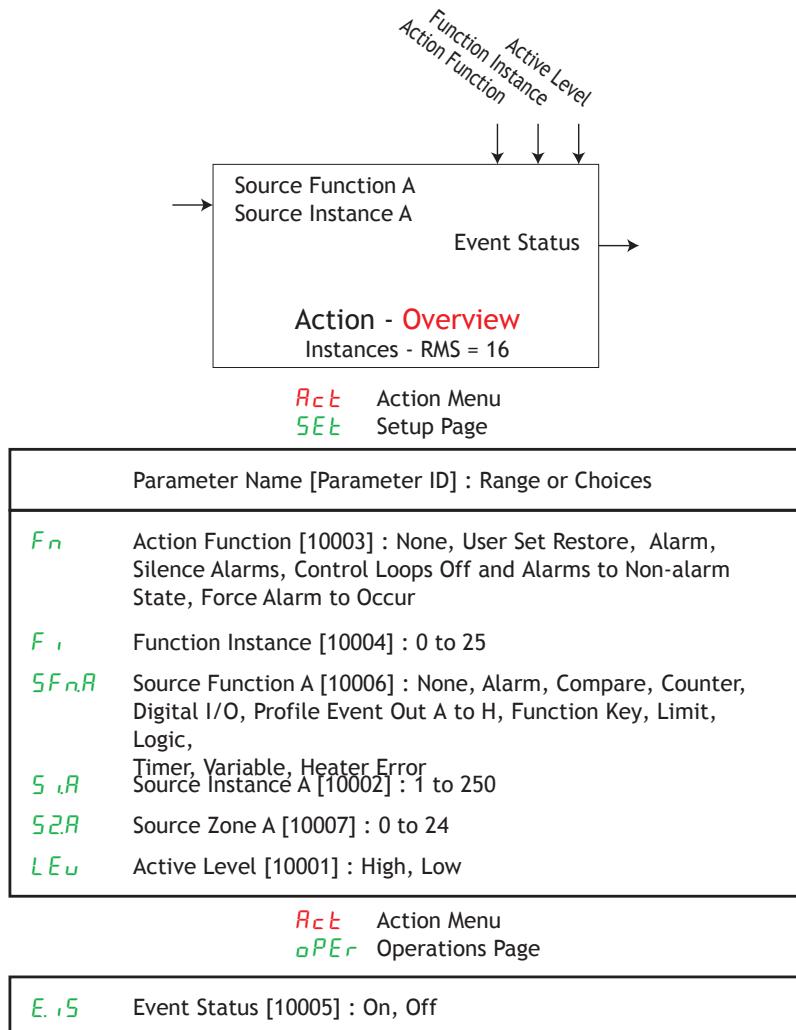
Each of the next several pages graphically shows each of the RMC function blocks. Note that as you view each, you will find text that is black and text that appears gray. The gray text represents inputs that are not currently available based on the functions defined use (red text). For instance, when the defined use of the Analog Input function is set for RTD, TC Linearization will appear gray. Ranges specified are in units or degrees F, if expressed in degrees C, the range will be smaller.

Action Function

The Action Function will cause the action selected to occur with in the module where the action function resides when Source Function A = ON and Active Level = High. Based on a given input (Digital I/O, Event output, Logic function, etc..) the Action function can cause other functions to occur. To name a few, starting and stopping a profile, silencing alarms, turn control loops off and placing alarms in non-alarm state.

Note:

Action Function selection is module type and part number dependant.

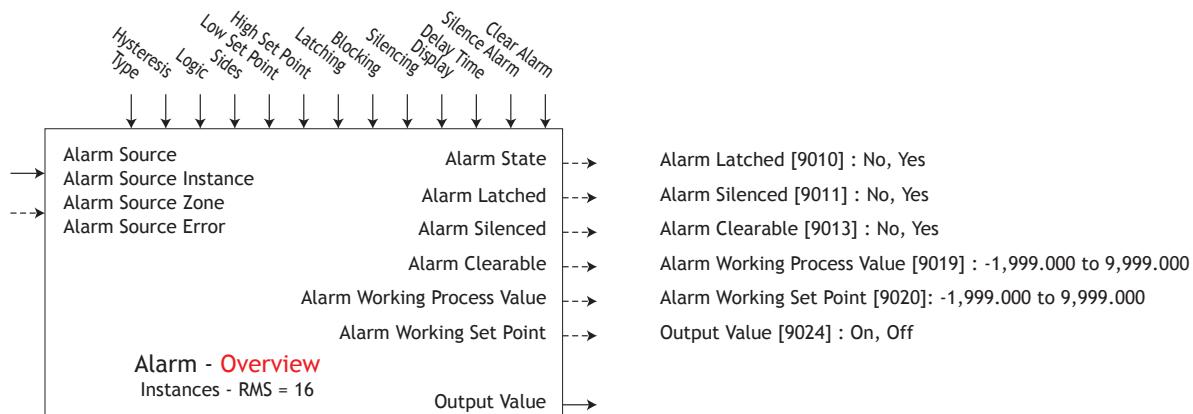


Alarm Function

Alarms are activated when the output level, process value or temperature leaves a defined range. A user can configure how and when an alarm is triggered, what action it takes and whether it turns off automatically when the alarm condition is over.

Configure alarm outputs in the Setup Page before setting alarm set points.

Alarms do not have to be assigned to an output. Alarms can be monitored and controlled through the front panel or by using software.



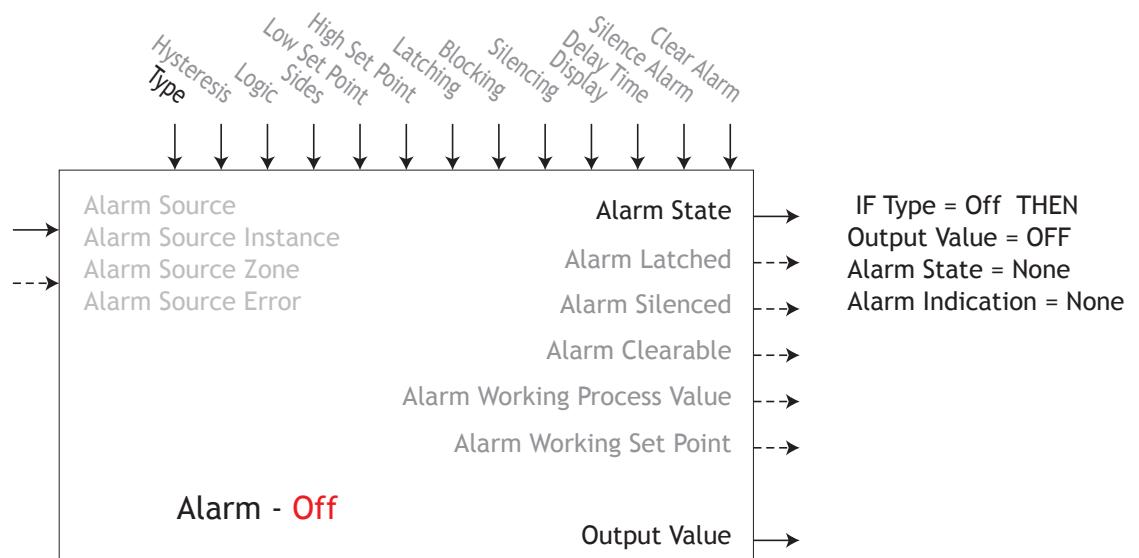
ALRM Alarm Menu
SET Setup Page

Parameter Name [Parameter ID] : Range or Choices	
RtY	Type [9015] : Off, Process
SrA	Alarm Source [9017] : None, Analog Input, Current, Power, Linearization, Math, Process Value, Variable, Current Read, Wattage, Load Voltage, Load Resistance
srA	Alarm Source Instance [9018] : 1 to 250
S2R	Alarm Source Zone [9025] : 0 to 24
LoP	Control Loop [9023] : 1 to 250
RhY	Hysteresis [9003] : 0.001 to 9,999.000
RL9	Logic [9005] : Close on Alarm, Open on Alarm
RSd	Sides [9004] : Both, High, Low
RLo	Low Set Point [9002] : -1,999.000 to 9,999.000
Rh1	High Set Point [9001] : -1,999.000 to 9,999.000
LRL	Latching [9007] : Non-Latching, Latching
RLB	Blocking [9008] : Off, Startup, Set Point, Both
RS1	Silencing [9006] : Off, On
RdSP	Display [9016] : Off, On
RdL	Delay Time [9021] : 0 to 9,999 seconds
RCLR	Clear Alarm [9026] : Ignore, Clear
RS1r	Silence Alarm [9027] : Ignore, Silence Alarms
RS1t	Alarm State [9009] : Startup, None, Blocked, Alarm Low, Alarm High, Error

ALRM Alarm Menu
oPER Operations Page

RLo	Low Set Point [9002] : -1,999.000 to 9,999.000
Rh1	High Set Point [9001]: -1,999.000 to 9,999.000
RCLR	Clear Alarm [9026] : Ignore, Clear
RS1r	Silence Alarm [9027] : Ignore, Silence Alarms
RS1t	Alarm State [9009] : Startup, None, Blocked, Alarm Low, Alarm High, Error

Alarm (cont.)

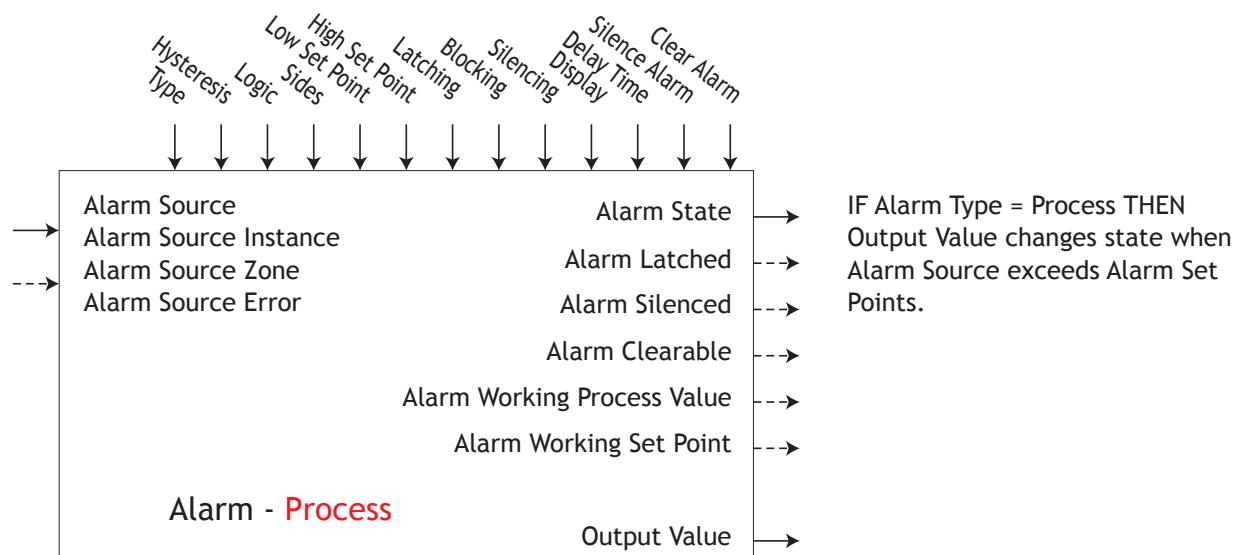


When function = Off THEN

Output Value = OFF

Alarm State = None

Alarm Indication = None



When function = Process THEN

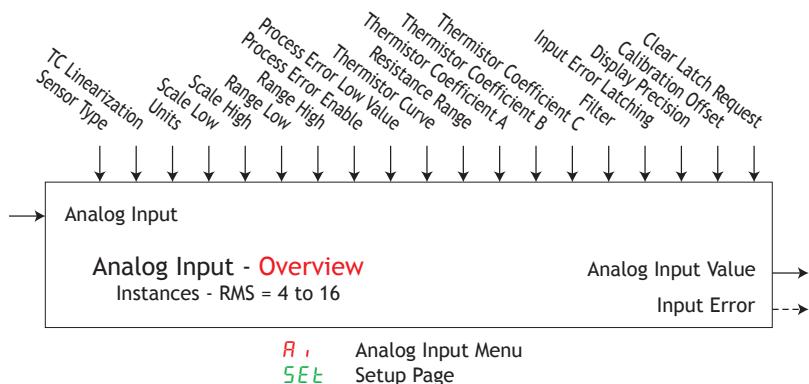
Output Value = True when Alarm Source <= Low Set Point or

>= High Set Point

Analog Input Function

Note:

This function configures and connects physical inputs to internal functions. Configure the sensor type to match what is connected. For process inputs such as potentiometer, voltage, or milliampere, set the electrical span using scale low/high and engineering representation range using range low/high. Apply the corresponding units of measure.



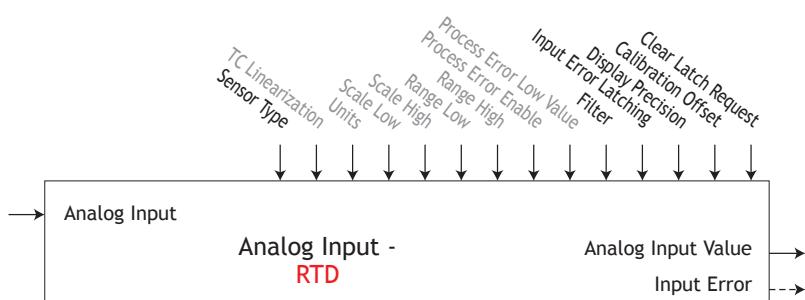
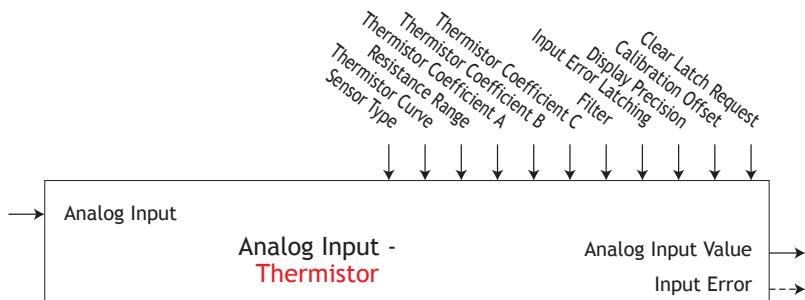
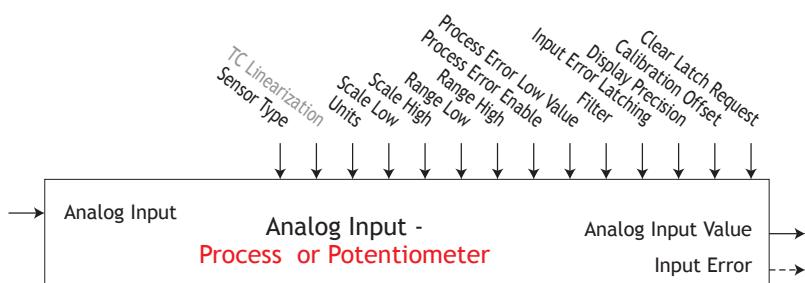
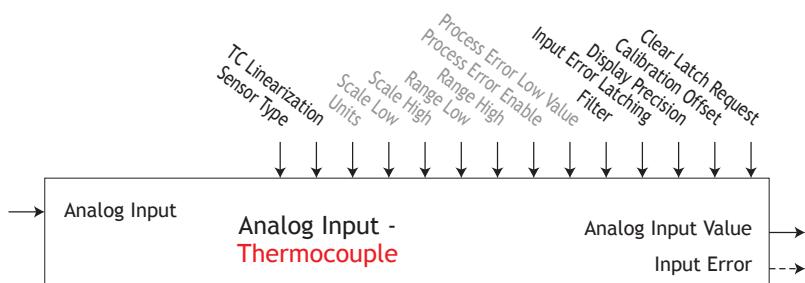
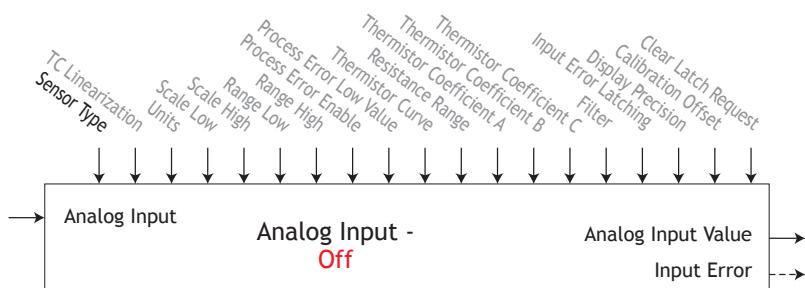
Parameter Name [Parameter ID] : Range or Choices	
SEN	Sensor Type [4005] : Off, Thermocouple, Millivolts, Volts, Milliamps, RTD 100 Ohm, RTD 1000 Ohm, 1K Potentiometer, Thermistor (optional)
LIN	TC Linearization [4006] : B, C, D, E, F, J, K, N, R, S, T
UNI	Units [4042] : Absolute Temperature, Power, Process, Relative Humidity
SLA	Scale Low [4015] : -100.00 to 1000.00
SHI	Scale High [4016] : -100.00 to 1000.00
RLA	Range Low [4017] : -1,999.000 to 9,999.000
RHI	Range High [4018] : -1,999.000 to 9,999.000
PEE	Process Error Enable [4030] : Off, Low
PEL	Process Error Low Value [4031] : -100.00 to 1,000.00
TC	Thermistor Curve [4038] : Curve A, Curve B, Curve C, Custom
CAC	Thermistor Coefficient A [4039] : -1,999.000 to 9,999.000
CAB	Thermistor Coefficient B [4040] : -1,999.000 to 9,999.000
CAC	Thermistor Coefficient C [4041] : -1,999.000 to 9,999.000
RR	Resistance Range [4037] : 5k, 10k, 20k, 40k
FL	Filter [4014] : 0.0 to 60.0 seconds
IEL	Input Error Latching [4028] : Off, On
DPC	Display Precision [4020] : Whole, Tenths, Hundredths, Thousandths
COA	Calibration Offset [4012] : -1,999.000 to 9,999.000
AIV	Analog Input Value [4001] : -1,999.000 to 9,999.000
IEF	Input Error [4002] : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Not Sourced

R Analog Input Menu
OPER Operations Page

AIV	Analog Input Value [4001] : -1,999.000 to 9,999.000
IEF	Input Error [4002] : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Not Sourced
COA	Calibration Offset [4012] : -1,999.000 to 9,999.000

Clear Latch Request [4029] : Clear, Ignore

Analog Input (cont.)

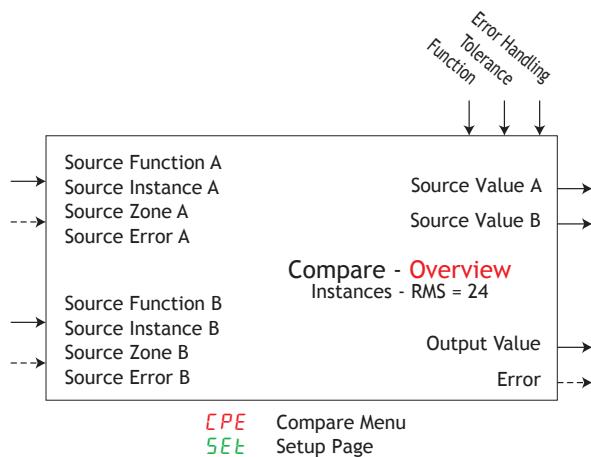


Compare Function

Use the compare function to compare two analog values (A and B) for a condition such as are they equal. If the compare condition is met, the output turns on.

The tolerance is expressed in the same units as Source A and Requires Source A and Source B to be without errors for function to work.

Error [28013] : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale

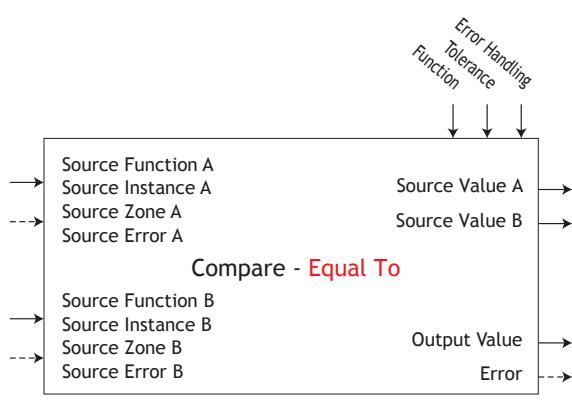
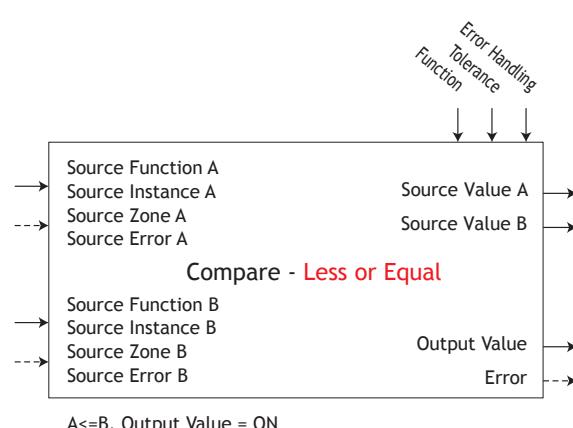
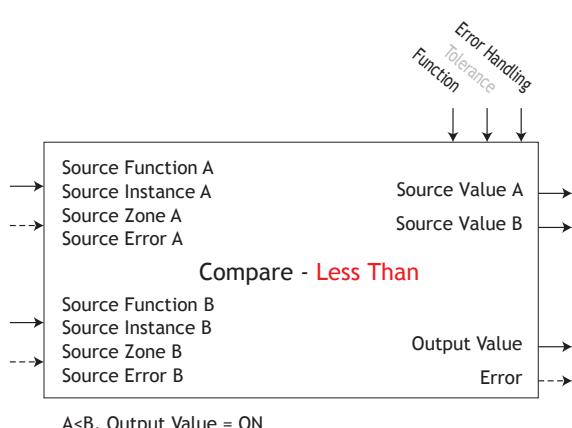
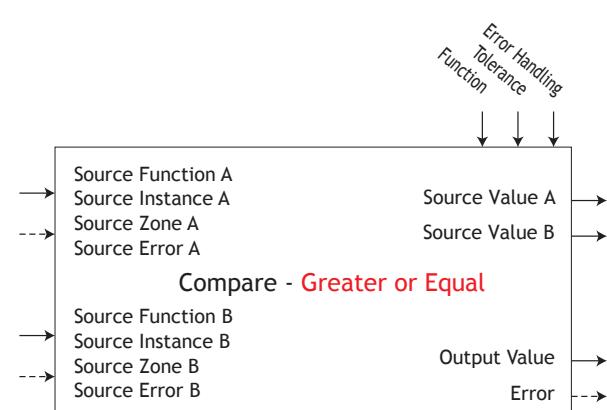
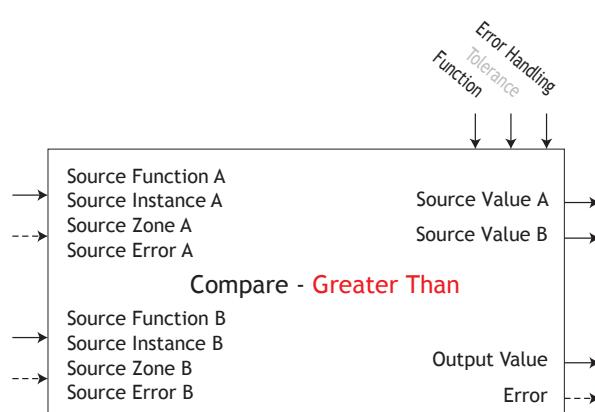
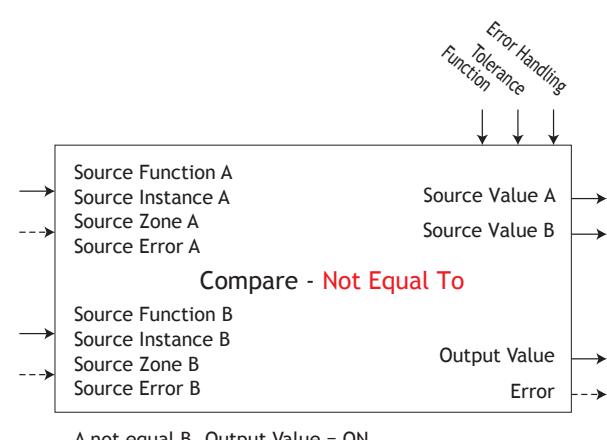
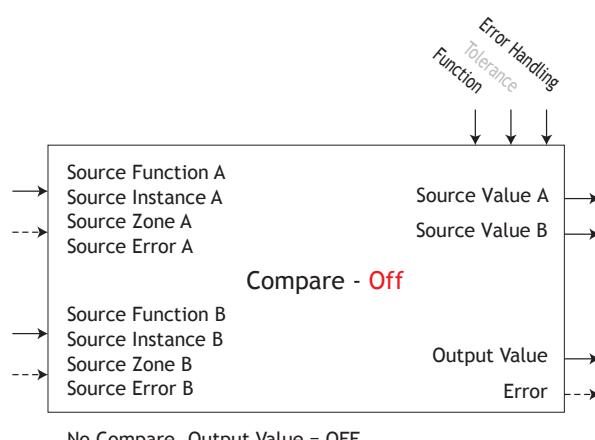


Parameter Name [Parameter ID] : Range or Choices	
<i>Fn</i>	Function [28009] : Off, Greater Than, Less Than, Equal To, Not Equal To, Greater or Equal, Less or Equal
<i>Tol</i>	Tolerance [28011] : 0.0 to 9,999.000 units or F
<i>SFnA</i>	Source Function A [28001] : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable, Wattage, Load Voltage, Load Resistance
<i>SIA</i>	Source Instance A [28003] : 1 to 250
<i>SZA</i>	Source Zone A [28005] : 0 to 24
<i>SFnB</i>	Source Function B [28002] : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable, Wattage, Load Voltage, Load Resistance
<i>SIB</i>	Source Instance B [28004] : 1 to 250
<i>SZB</i>	Source Zone B [28006] : 0 to 24
<i>Er.h</i>	Error Handling [28012] : False Bad, False Good, True Bad, True Good

CPE Compare Menu
oPER Operations Page

<i>SuA</i>	Source Value A [28007] : -1,999.000 to 9,999.000 units or F
<i>Sub</i>	Source Value B [28008] : -1,999.000 to 9,999.000 units or F
<i>ou</i>	Output Value [28010] : Off, On

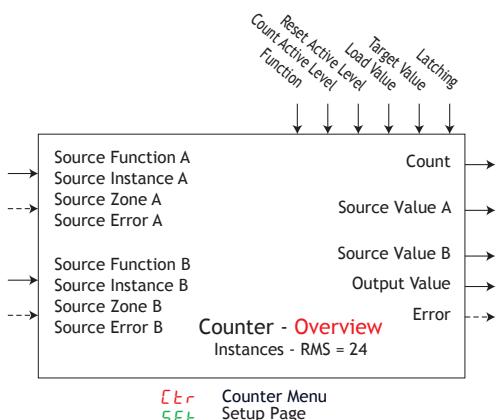
Compare (cont.)



Counter Function

Counters increment up or down from a preset value. When the count is equal to the target, the output value will be active.

- Function selects whether the counter increments or decrements the count value. Decreasing to 0 returns 9,999; incrementing to 9,999 returns 0.
- Source Function A selects which type of function increments the Count.
- Source Instance A and Source Zone A select which source to use.
- Count Active Level selects which state increments the Count.
- Source Function B selects which type of function resets the Count to the Load Value .
- Source Instance B and Source Zone B selects which source to use.
- Reset Active Level selects which state resets the Count.
- Load Value sets the counter's initial value. Count is set to this value each time the controller is powered up and each time the counter is reset.
- Target Value sets the value at which the output turns on.
- Latching sets the behavior for the output when Count exceeds the Target Value.
- Error [30016] : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



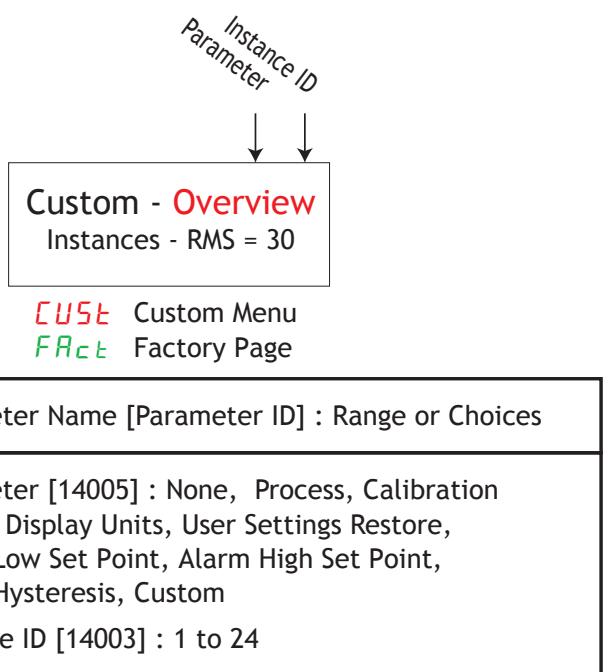
Parameter Name [Parameter ID] : Range or Choices	
Fn	Function [30009] : Up, Down
SFnA	Source Function A [30001] : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Timer, Variable, Heater Error
SIA	Source Instance A [30003] : 1 to 250
SZA	Source Zone A [30005] : 0 to 24
SASL	Count Active Level [30011] : High, Low, Both
SFnB	Source Function B [30002] : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Timer, Variable, Heater Error
SIB	Source Instance B [30004] : 1 to 250
SZB	Source Zone B [30006] : 0 to 24
SASB	Reset Active Level [30012] : High, Low, Both
LoRd	Load Value [30013] : 0 to 9,999
trgt	Target Value [30014] : 0 to 9,999
LAt	Latching [30017] : No, Yes

Etr Counter Menu
oPER Operations Page

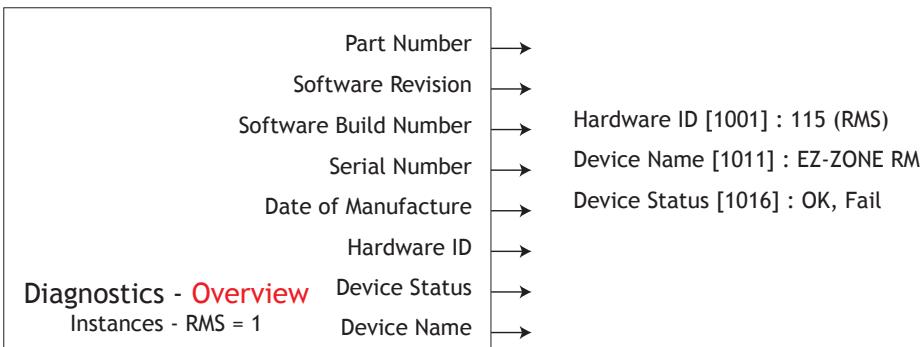
Cnt	Count [30015] : 0 to 9,999
SvA	Source Value A [30007] : Off, On
SvB	Source Value B [30008] : Off, On
ov	Output Value [30010] : Off, On

Custom Function

Use custom menu to set the user defined parameters to display at the Home Page of an RUI/Gateway.



Diagnostic Function

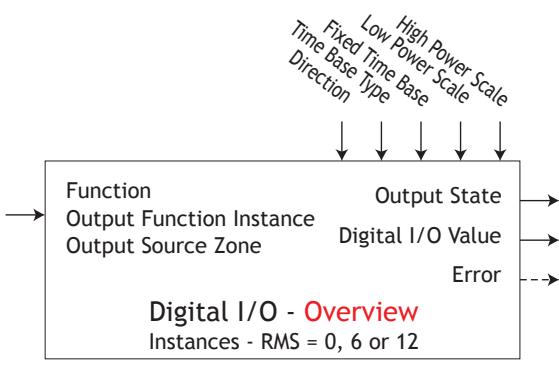


Parameter Name [Parameter ID] : Range or Choices	
Pn	Part Number [1009] :
rEu	Software Revision [1003] : 9.00, ...
SbLd	Software Build Number [1005] :
Sn	Serial Number [1007] : xxxxxx
dRtE	Date of Manufacture [1008] : YWW

Digital Input/Output Function

The Output Value is determined by Function connection and Direction.

- Error [6015] : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



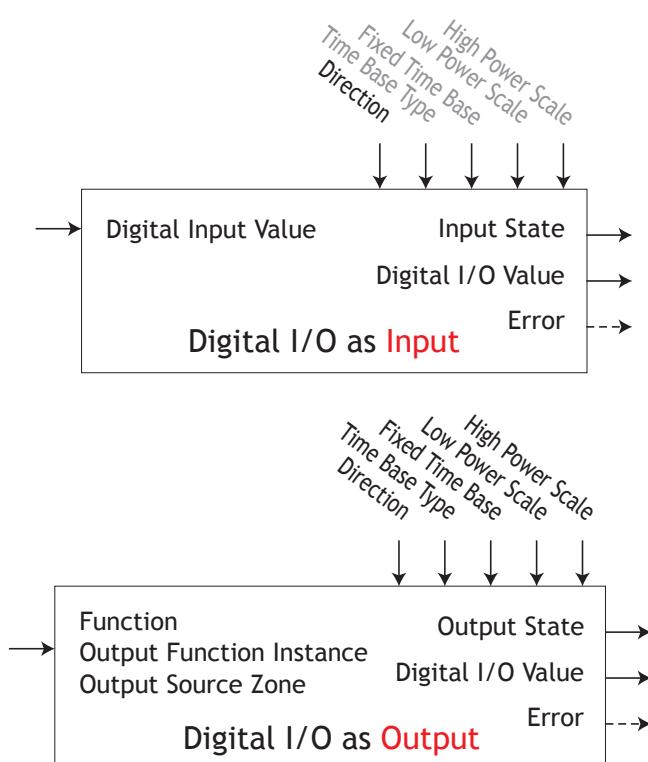
d i o Digital I/O Menu
SEt Setup Page

Parameter Name [Parameter ID] : Range or Choices	
dir	Direction [6001] : Output, Input Voltage, Input Dry Contact
Fn	Function [6005] : Off, Analog Input, Alarm, Cool Power, Heat Power, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Linearization, Math, Process Value, Special Function Output 1 to 4, Timer, Variable
F_i	Output Function Instance [6006] : 1 to 24
SZn	Output Source Zone [6012] : 0 to 16
aCT	Time Base Type [6002] : Fixed Time Base, Variable Time Base
atb	Fixed Time Base [6003] : 0.1 to 60.0 seconds
alo	Low Power Scale [6009] : 0.0 to 100.0 %
ah	High Power Scale [6010] : 0.0 to 100.0 %

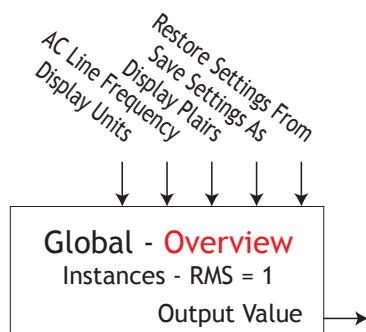
d i o Digital I/O Menu
oPEr Operations Page

d i S	Input State [6011] : On, Off
doS	Output State [6007] : On, Off

Digital Input/Output (cont.)



Global Function



9LbL Global Menu

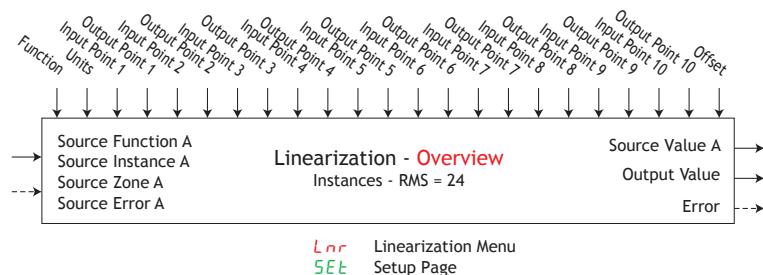
SEt Setup Page

Parameter Name [Parameter ID] : Range or Choices	
C_F	Display Units [3005] : F, C
ACLF	AC Line Frequency [1034] : 50 Hz, 60 Hz
dPrS	Display Pairs [3028] : 1 to 15
USr.S	Save Settings As [1014] : None, User Set 1
USr.r	Restore Settings From [1013] : None, User Set 1, Factory

Linearization Function

This function will take an analog Source A and re-linearize using a 10-point offset, then add Offset and produce an Output Value.

- Error [34028]: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale

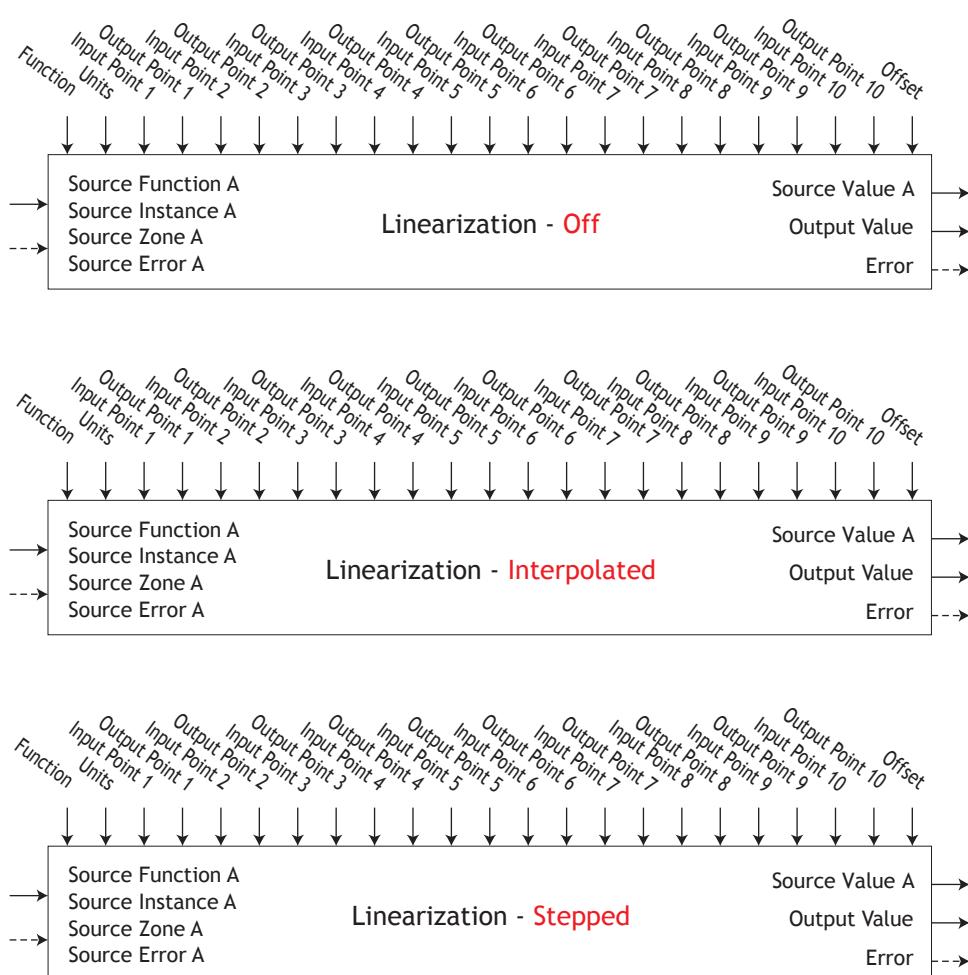


Parameter Name [Parameter ID]	Range or Choices
<i>Fn</i>	Function [34005] : Off, Interpolated, Stepped
<i>SFnA</i>	Source Function A [34001] : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable
<i>SIA</i>	Source Instance A [34002] : 1 to 24
<i>SZA</i>	Source Zone A [34003] : 0 to 16
<i>Un_it</i>	Units [34029] : Source, None, Absolute Temperature, Relative Temperature, Power, Process, Relative Humidity
<i>IP_1</i>	Input Point 1 [34008] : -1,999.000 to 9,999.000
<i>OP_1</i>	Output Point 1 [34018] : -1,999.000 to 9,999.000
<i>IP_2</i>	Input Point 2 [34009] : -1,999.000 to 9,999.000
<i>OP_2</i>	Output Point 2 [34019] : -1,999.000 to 9,999.000
<i>IP_3</i>	Input Point 3 [34010] : -1,999.000 to 9,999.000
<i>OP_3</i>	Output Point 3 [34020] : -1,999.000 to 9,999.000
<i>IP_4</i>	Input Point 4 [34011] : -1,999.000 to 9,999.000
<i>OP_4</i>	Output Point 4 [34021] : -1,999.000 to 9,999.000
<i>IP_5</i>	Input Point 5 [34012] : -1,999.000 to 9,999.000
<i>OP_5</i>	Output Point 5 [34022] : -1,999.000 to 9,999.000
<i>IP_6</i>	Input Point 6 [34013] : -1,999.000 to 9,999.000
<i>OP_6</i>	Output Point 6 [34023] : -1,999.000 to 9,999.000
<i>IP_7</i>	Input Point 7 [34014] : -1,999.000 to 9,999.000
<i>OP_7</i>	Output Point 7 [34024] : -1,999.000 to 9,999.000
<i>IP_8</i>	Input Point 8 [34015] : -1,999.000 to 9,999.000
<i>OP_8</i>	Output Point 8 [34025] : -1,999.000 to 9,999.000
<i>IP_9</i>	Input Point 9 [34016] : -1,999.000 to 9,999.000
<i>OP_9</i>	Output Point 9 [34026] : -1,999.000 to 9,999.000
<i>IP_10</i>	Input Point 10 [34017] : -1,999.000 to 9,999.000
<i>OP_10</i>	Output Point 10 [34027] : -1,999.000 to 9,999.000

Lnr Linearization Menu
 oPer Operations Page

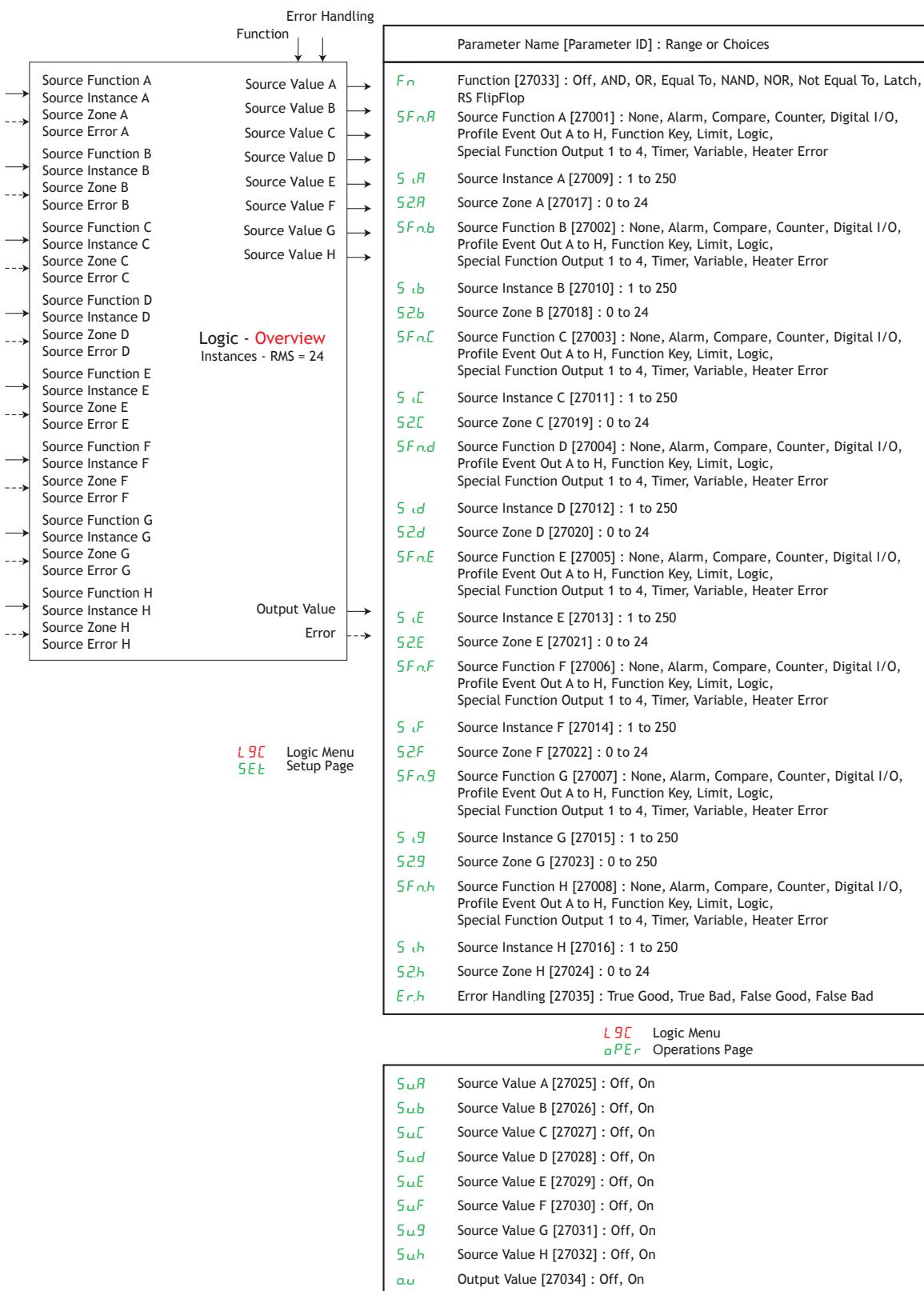
<i>SvA</i>	Source Value A [34004] : -1,999.000 to 9,999.000
<i>oFSt</i>	Offset [34006] : -1,999.000 to 9,999.000
<i>ou</i>	Output Value [34007] : -1,999.000 to 9,999.000

Linearization (cont.)

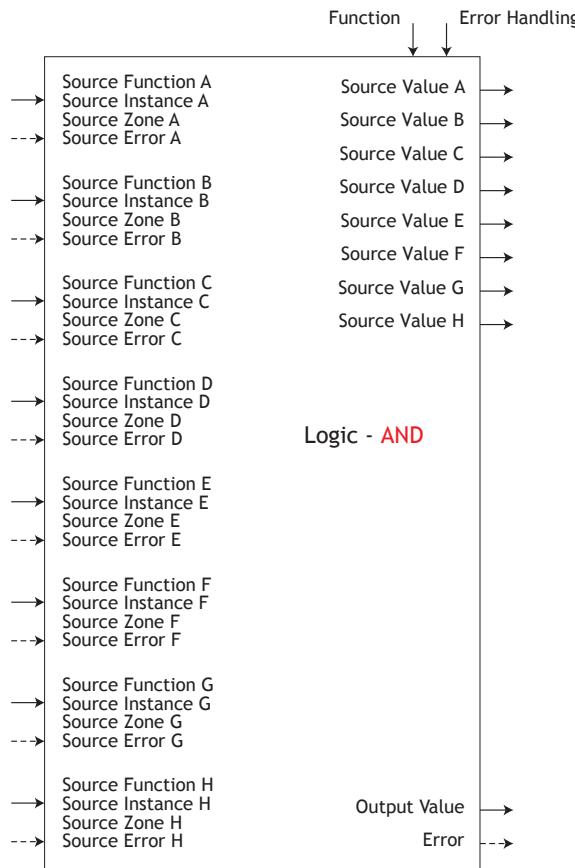


Logic Function

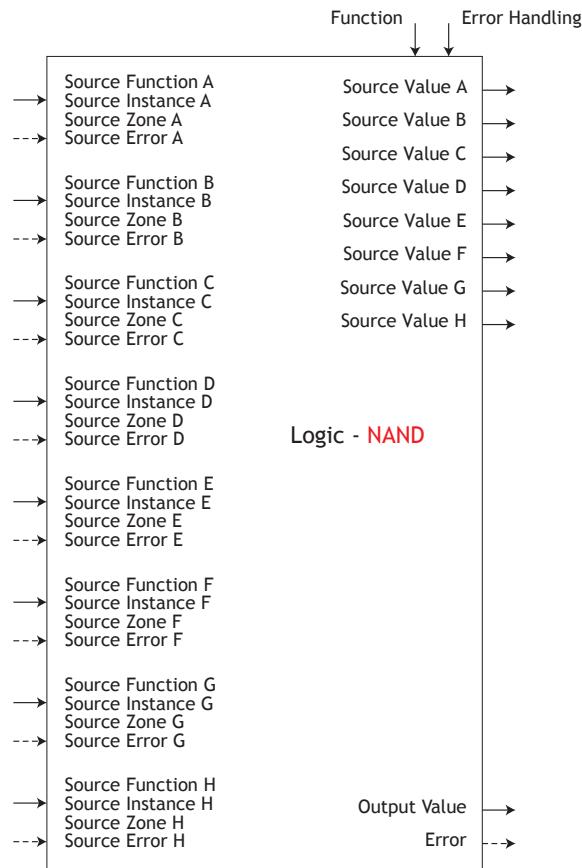
- Error [27036] : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



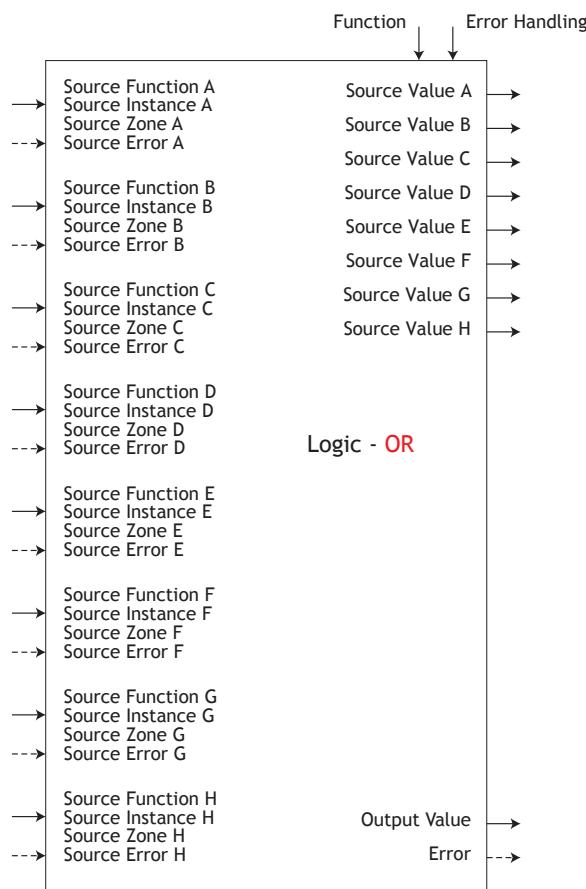
Logic (cont.)



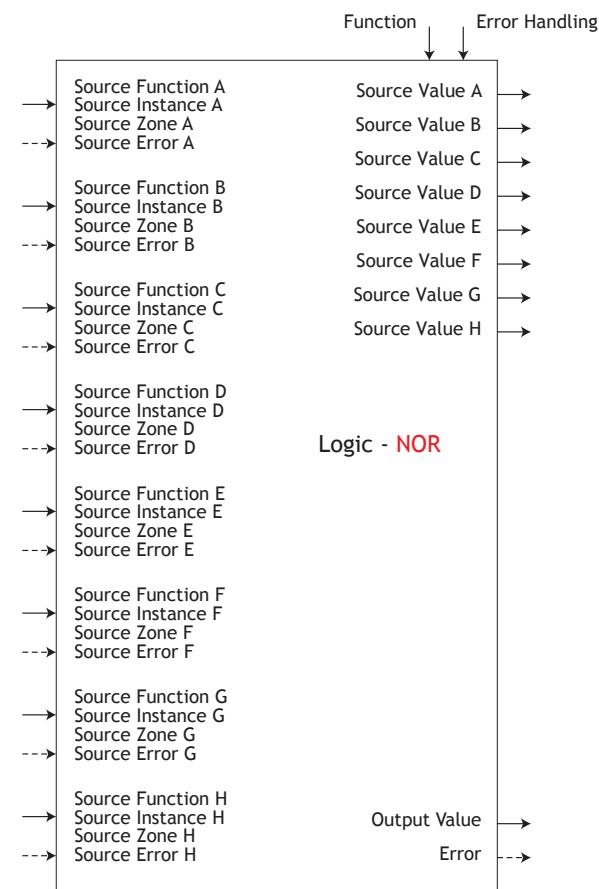
$$A^* B^* C^* D^* E^* F^* G^* H = ON$$



$$\overline{A^* B^* C^* D^* E^* F^* G^* H} = ON$$

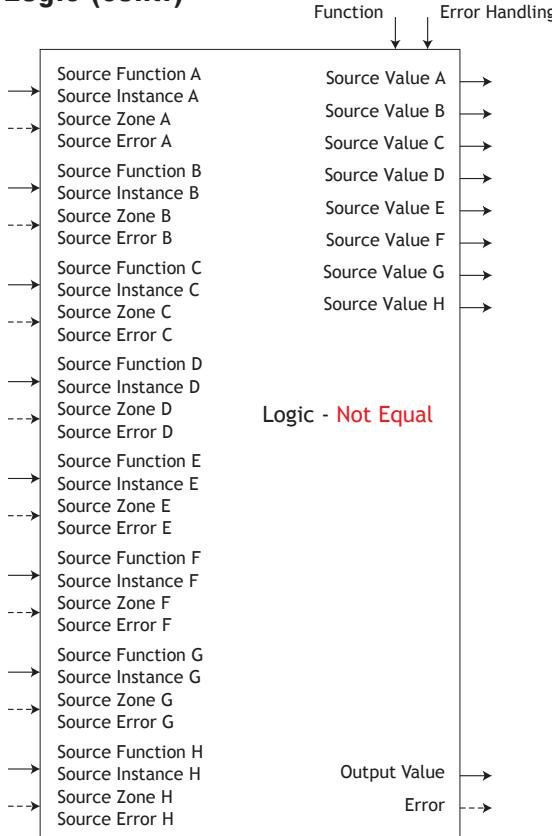


$$A + B + C + D + E + F + G + H = ON$$

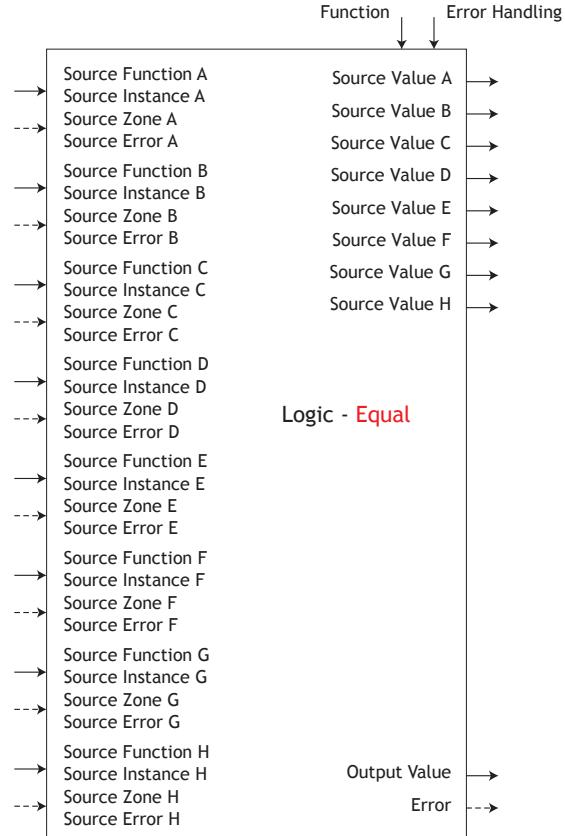


$$\overline{A + B + C + D + E + F + G + H} = ON$$

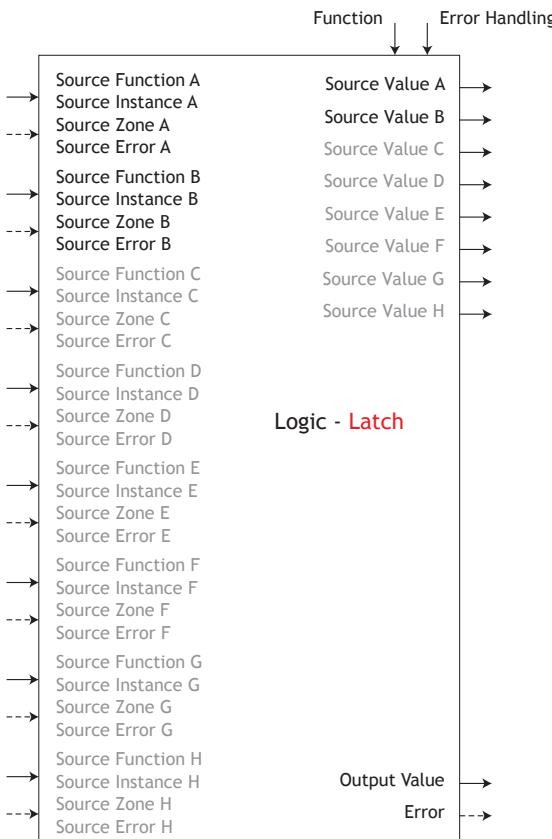
Logic (cont.)



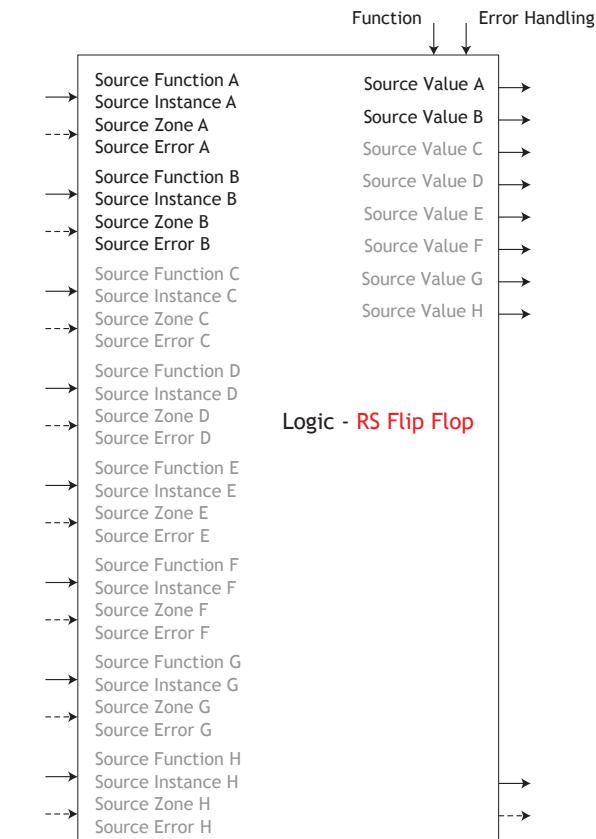
If A ≠ B ≠ C ≠ D ≠ E ≠ F ≠ G ≠ H then ON



If A = B = C = D = E = F = G = H then ON

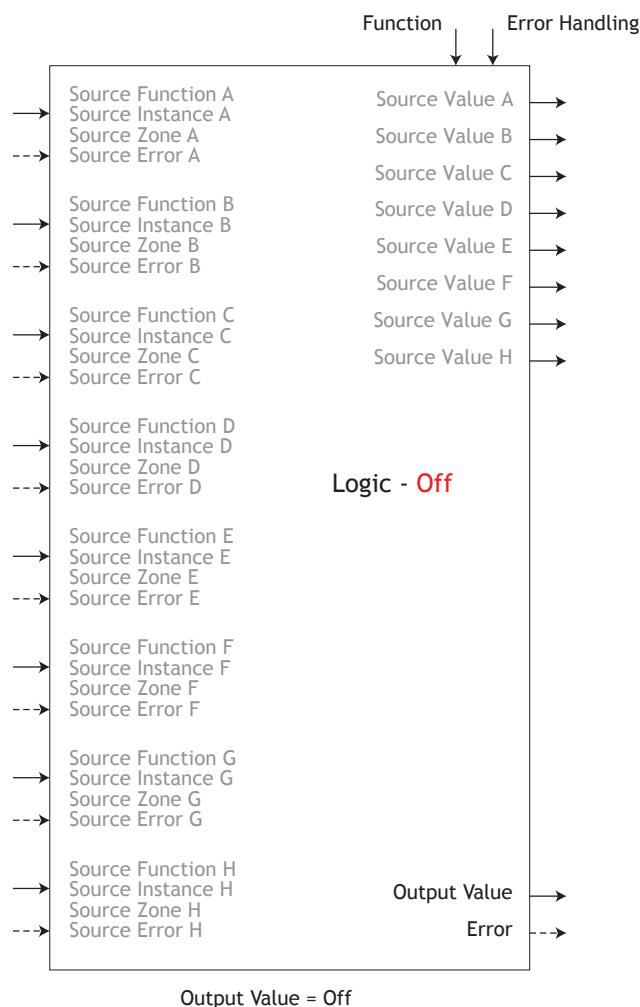


Output Value follows A, unless B = ON
Latch Output while B = ON



A Sets Output Value ON, B Resets Output Value OFF

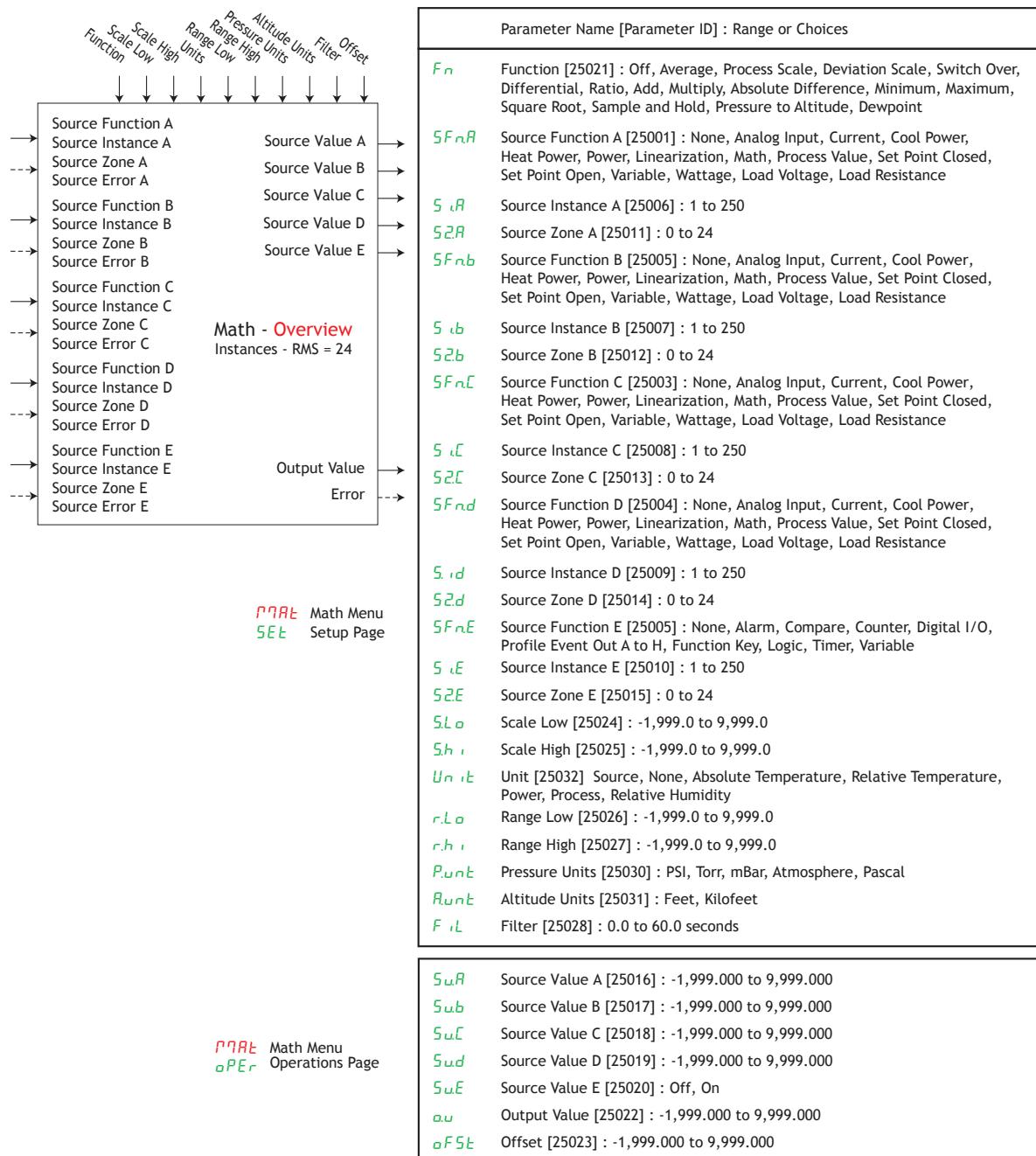
Logic (cont.)



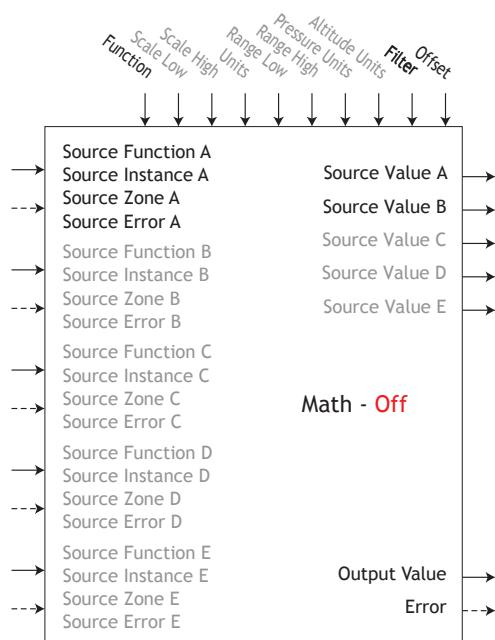
Math Function

The Math function block accepts multiple inputs and performs a programmed math function to derive an output value with Filter and Offset values applied. It is assumed that no input error conditions apply. Some math operations must be performed in the user's units. Functions may combine multiple inputs. Those inputs may have incompatible units from a logical point of view. As a result, unless otherwise indicated, the presentation of the output value is the same as Source A. This accommodates temperatures being multiplied, divided and offset by constants and process inputs. Only inputs pointed to a source are used in the calculations.

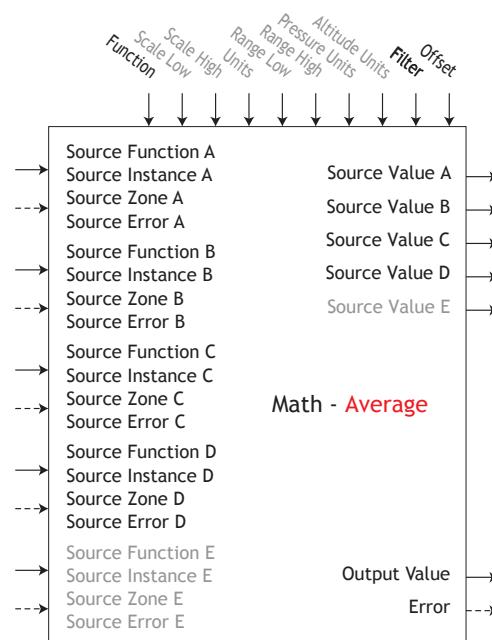
- Error [25029]: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



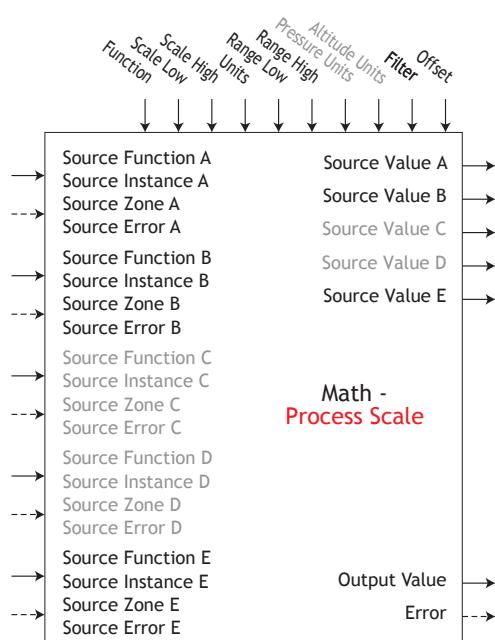
Math (cont.)



Output Value = Filter [A + Offset]
 Display units follows Source A

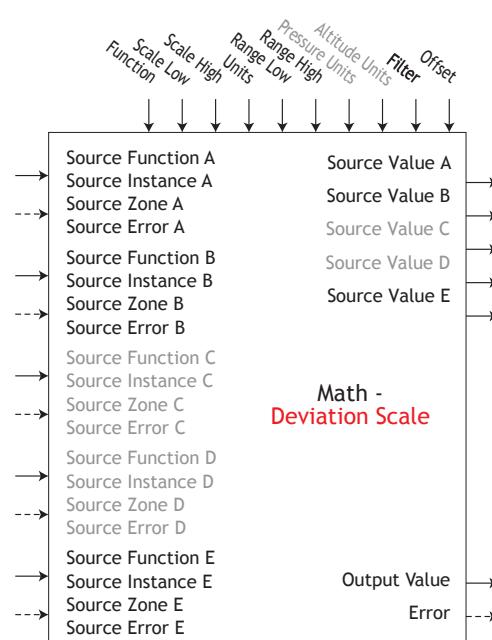


Output Value = Filter [(Average (A + B + C + D)) + Offset]
 Display units follows the last source that is temperature
 else follow Source A



If B = OFF, Output Value = Filter [(Range High - Range Low) / (Scale High - Scale Low) * (A - Scale Low) + Range Low + Offset]
 If B = ON, Output Value = Filter [B + Offset]

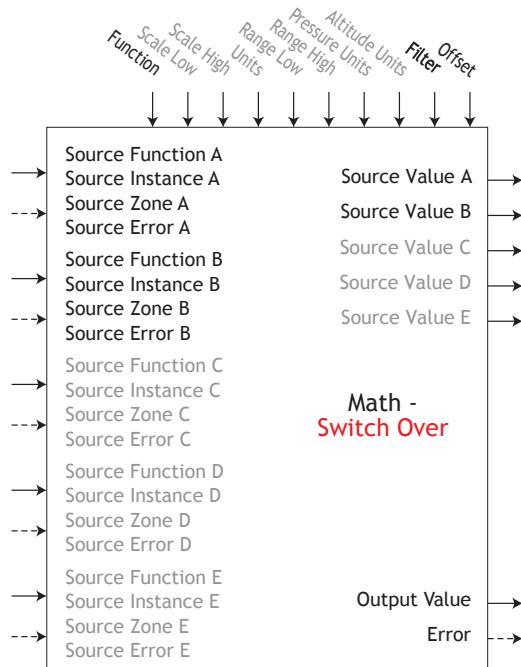
Scale Low/High and Range Low/High follows Source A display units when Units is set to Source, else follow Units setting.



If B = OFF, Output Value = Filter [((Range High - Range Low) / (Scale High - Scale Low)) * (A - Scale Low) + Range Low + B + Offset]
 If B = ON, Output Value = Filter [B + Offset]

Scale Low/High and Range Low/High follows Source A display units when Units is set to Source, else follow Units setting.

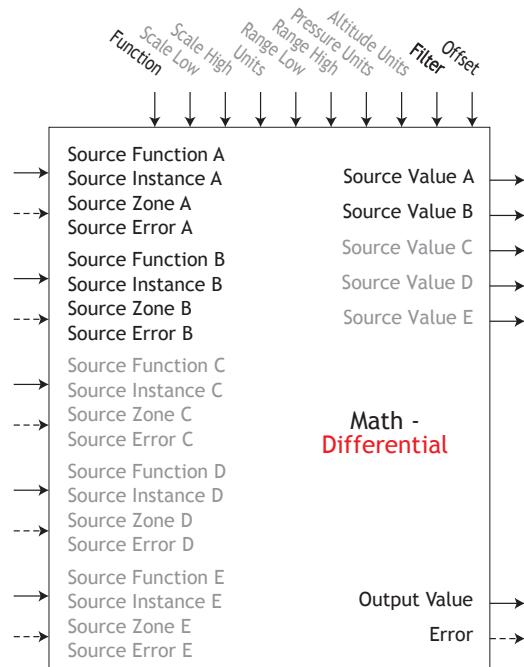
Math (cont.)



If B = OFF, Output Value = Filter [A + Offset]

If B = ON, Output Value = Filter [B + Offset]

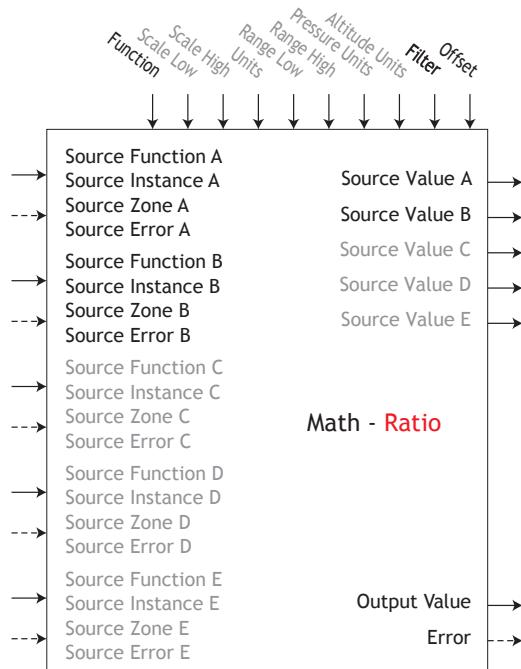
Display units follows active source.



Output Value = Filter [(A - B) + Offset]

Display units follows Source A plus relative

Source B

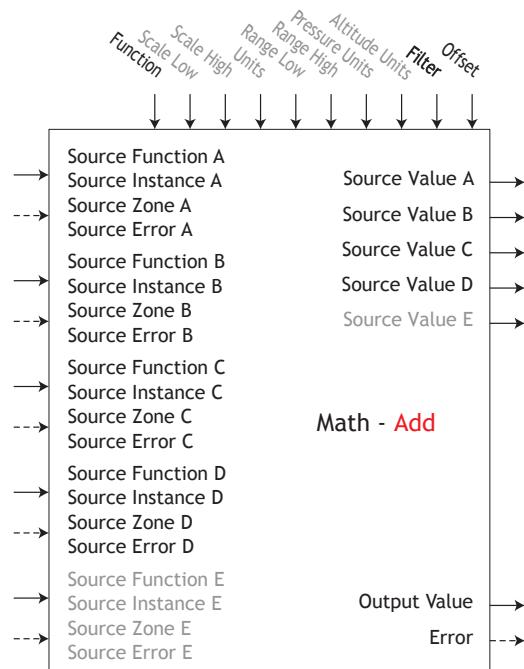


Math - Ratio

Output Value = Filter [(A / B) + Offset]

If display units of Source A = Source B, no display

units on output value, else follow Source A



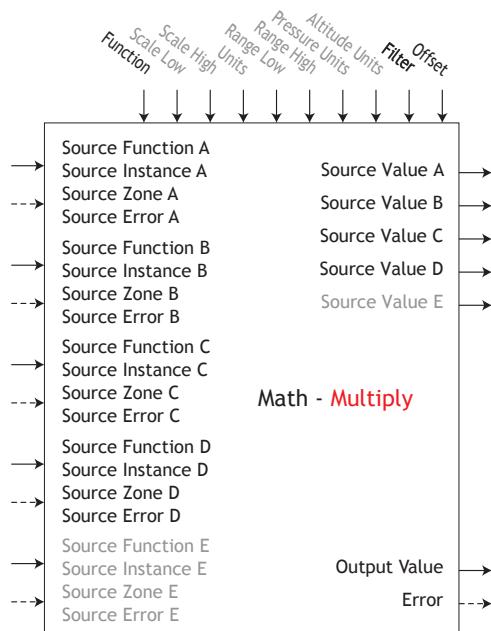
Math - Add

Output Value = Filter [(A + B + C + D) + Offset]

Display units follows last temperature source

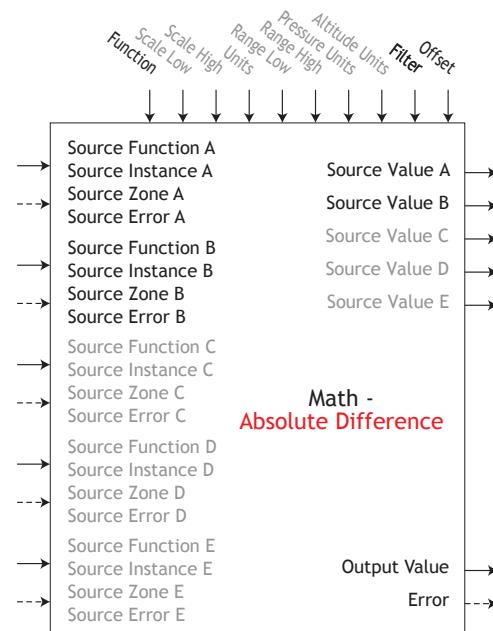
else follow Source A

Math (cont.)



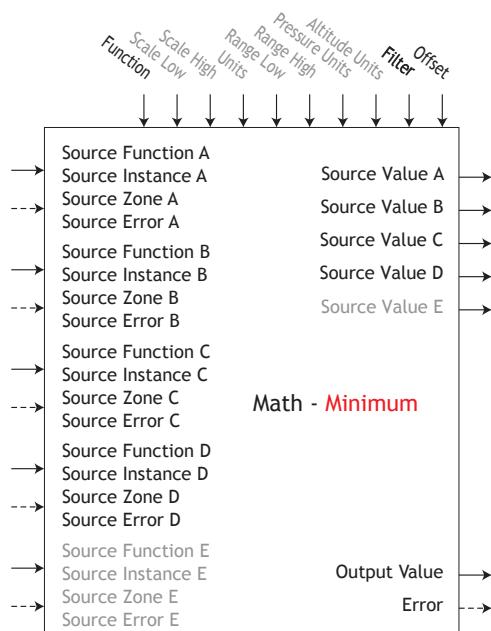
$$\text{Output Value} = \text{Filter} [(A * B * C * D) + \text{Offset}]$$

Display units follows last temperature source
else follow Source A



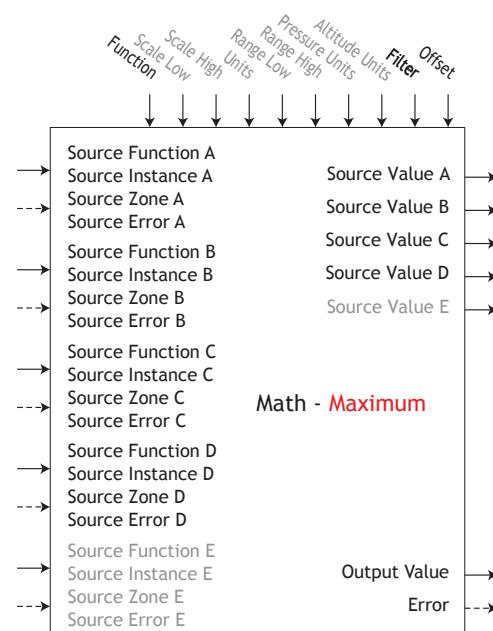
$$\text{Output Value} = \text{Filter } [| A - B | + \text{Offset}]$$

Display units follow Source A plus relative
Source B



$$\text{Output Value} = \text{Filter} [\text{Minimum Value (A : B : C : D)} + \text{Offset}]$$

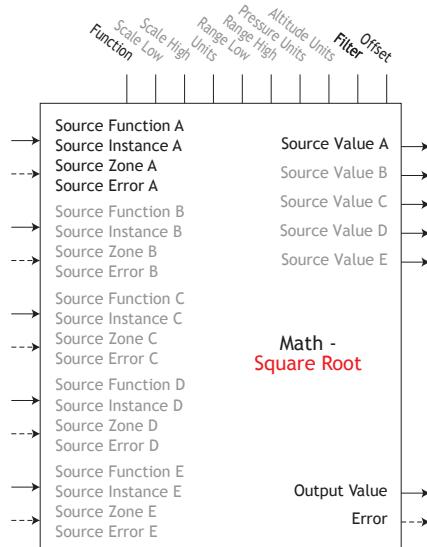
Display units follows Source with minimum
value.



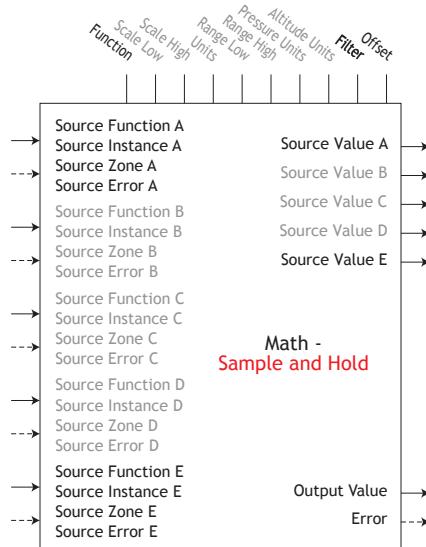
$$\text{Output Value} = \text{Filter} [\text{Maximum Value (A : B : C : D)} + \text{Offset}]$$

Display units follows Source with maximum
value.

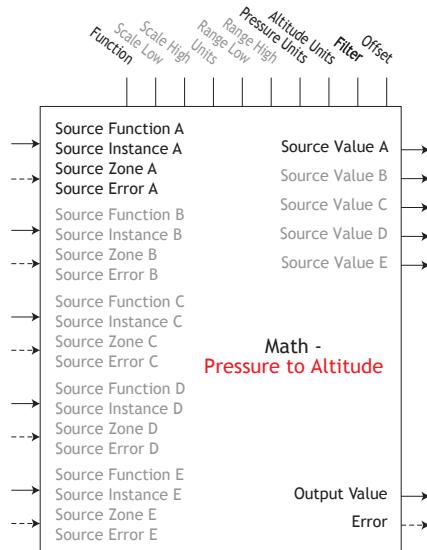
Math (cont.)



Output Value = Filter [Sqr Root A + Offset]
Display units follows Source A

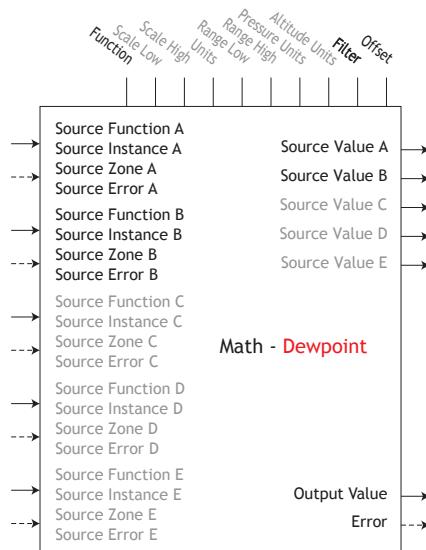


If E = OFF, Output Value = Filter [A + Offset]
If E = ON, Output Value = Filter [last value of A + Offset]
Display units follows Source A



Output Value = Filter [Convert Source A in Pressure to Altitude + Offset]

Note: Pressure Altitude calculation is based on the International Standard Atmosphere 1976. Source A is a pressure signal and needs to be in PSI units for the calculation. The calculation is accurate from sea level to 90,000 feet. It can be used beyond this range in both directions, but with loss of accuracy. The standard is based on an altitude of 0 feet (sea level) pressure of 14.6967 PSI and a temperature of 59 degrees F. Result of calculation is in feet.



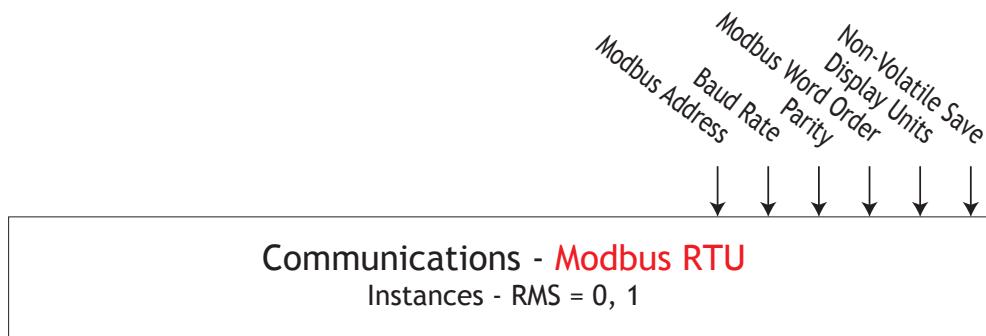
Output Value = Filter [$427.26 * (CP * B / 8.8618) / (17.27 * (CP * B / 8.8618)) + 32 + \text{Offset}$]

Source A is used for Calculated Pressure or CP ;

Note: For dewpoint, Source A is temperature (F) and Source B is RH (%). Saturation pressure calculation is identical to that used in wet/dry bulb. Result is in degrees F.

Modbus® Function

Configure the Modbus RTU serial communication settings using these parameters.



C_aR_T Communications Menu

S_EP Setup Page

Parameter Name [Parameter ID] : Range or Choices	
bRUD	Baud Rate [17002] : 19600, 19200, 38400
PAr	Parity [17003] : None, Even, Odd
PLHL	Modbus Word Order [17043] : Word Low High, Word High Low
D_U	Display Units [17050] : F, C
nVS	Non-Volatile Save [17051] : No, Yes

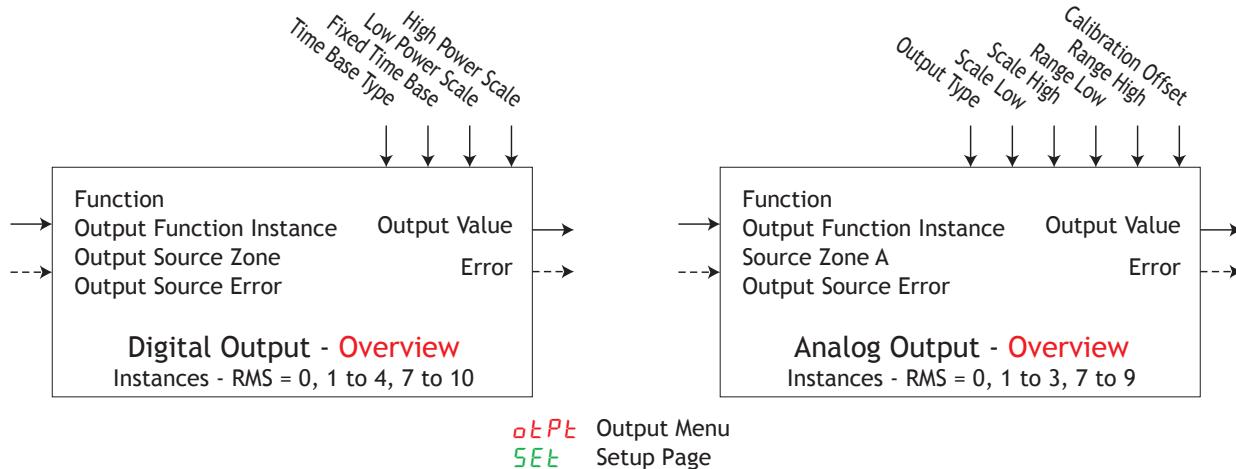
Output Function

This function configures and connects physical outputs to internal functions.

Note:

Digital Outputs not included on these sheets

- Output Value [18019] : 0 to 10.0 volts or 0 to 20.00 milliamperes
- Output Value [6011] : On, Off
- Error: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale

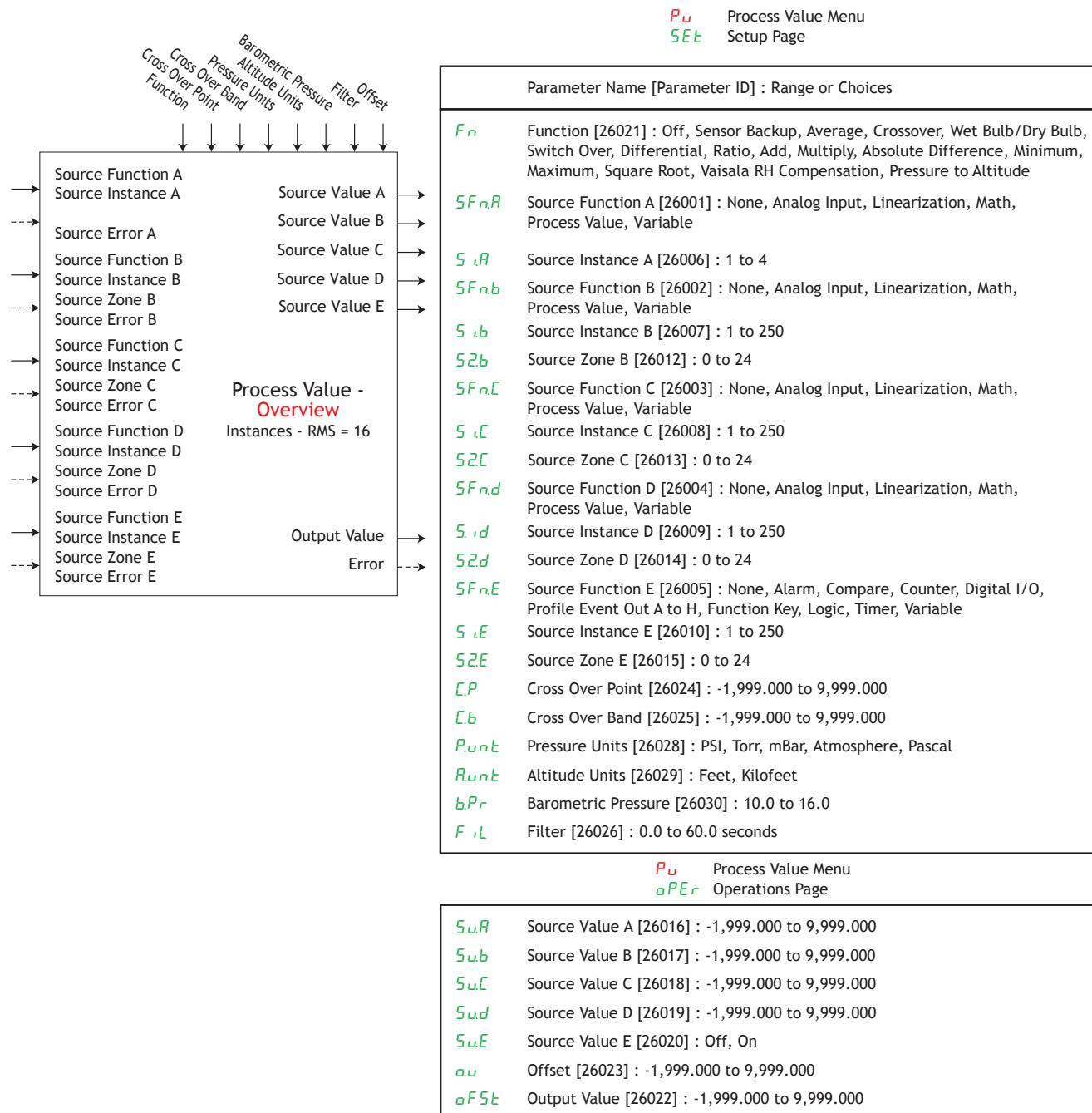


Parameter Name [Parameter ID] : Range or Choices	
Fn	Function [6005] : Off, Analog Input, Alarm, Cool Power, Heat Power, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Linearization, Math, Process Value, Special Function Output 1 to 4, Timer, Variable, Heater Error
F1	Output Function Instance [6006] : 1 to 250
S2	Output Source Zone [6012] : 0 to 24
aEt	Time Base Type [6002] : Fixed Time Base, Variable Time Base
aEb	Fixed Time Base [6003] : 0.1 to 60.0 seconds
aLo	Low Power Scale [6009] : 0 to 100 %
aHi	High Power Scale [6010] : 0 to 100 %
aEy	Output Type [18001] : Volts, Millamps
Fn	Function [18002] : Off, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Special Function Output 1 to 4, Variable, Wattage, Load Voltage, Load Resistance
F1	Output Function Instance [18004] : 1 to 250
S2A	Source Zone A [18019] : 0 to 24
SLa	Scale Low [18009] : 0.0 to 20.00
Shi	Scale High [18010] : 0.0 to 20.00
rLo	Range Low [18011] : -1,999.000 to 9,999.000
rHi	Range High [18012] : -1,999.000 to 9,999.000
aEr	Calibration Offset [18007] : -1,999.000 to 9,999.000

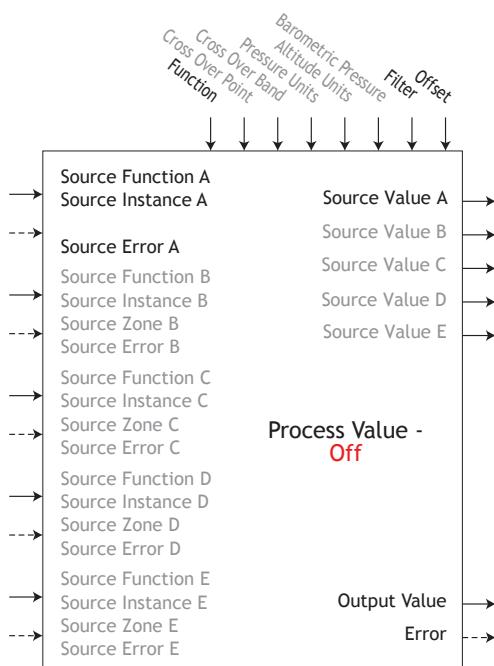
Process Value Function

The Process Value (PV) function block accepts multiple inputs and performs a programmed math function to derive an output value with Filter and Offset values applied. It is assumed that no input error conditions apply. Some PV operations must be performed in the user's units. Functions may combine multiple inputs. Those inputs may have incompatible units from a logical point of view. As a result, unless otherwise indicated, the presentation of the output value is the same as Source A. This accommodates temperatures being multiplied, divided and offset by constants and process inputs. Only inputs pointed to a source are used in the calculations.

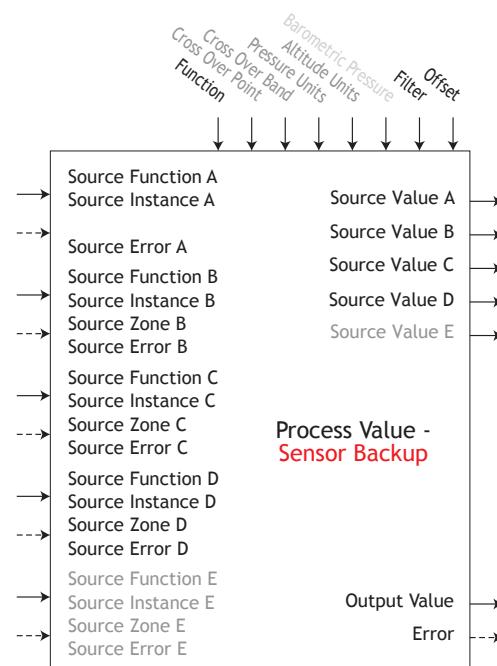
- Error [26027] : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



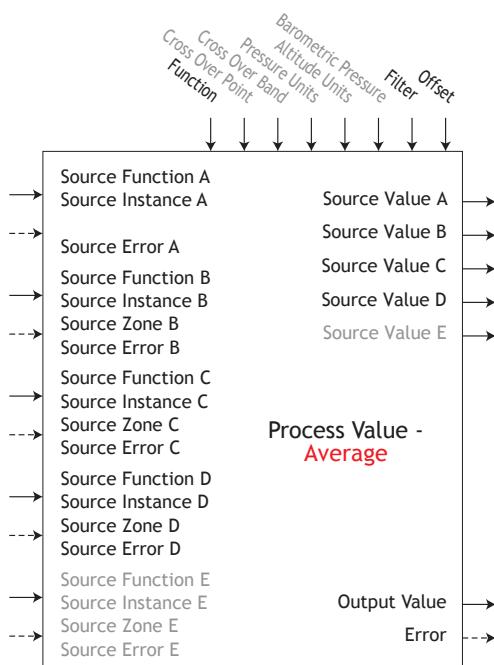
Process Value (cont.)



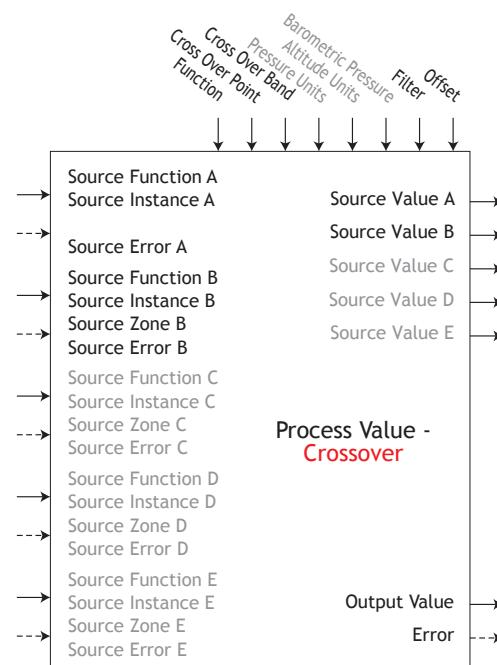
Output Value = Filter [A + Offset]
Display units follows Source A



Output Value = Filter [first assigned Source without an error + Offset]
Error

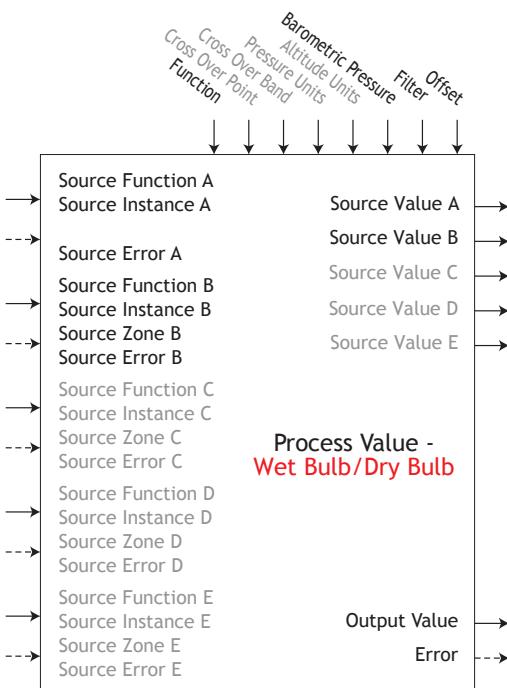


Output Value = Filter [(Average (A + B + C + D)) + Offset]
Display units follows the last source that is temperature
else follow Source A

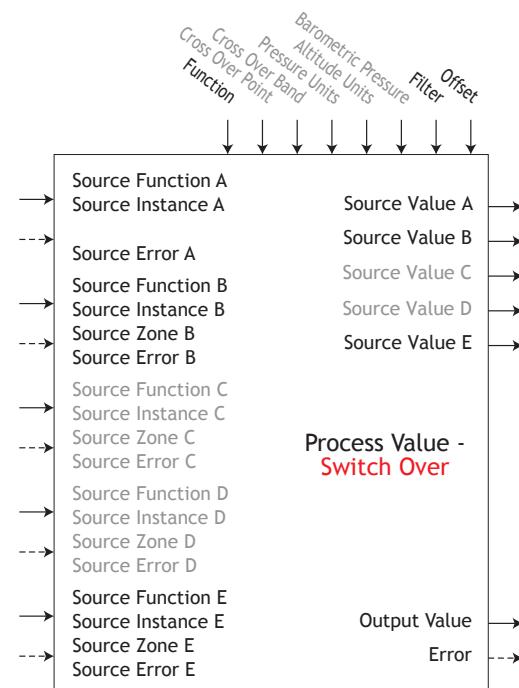


If $A \leq \text{Cross Over Point} - (\text{Cross Over Band} / 2)$ THEN Output Value = Filter [(A + Offset)]
If $A \geq \text{Cross Over Point} + (\text{Cross Over Band} / 2)$ THEN Output Value = Filter [(B + Offset)]
Output Value = Filter $[(A * X) + (B * (1-X)) + \text{Offset}]$
Where variable X = $(\text{Cross Over Point} + (\text{Cross Over Band} / 2) - A) / \text{Cross Over Band}$

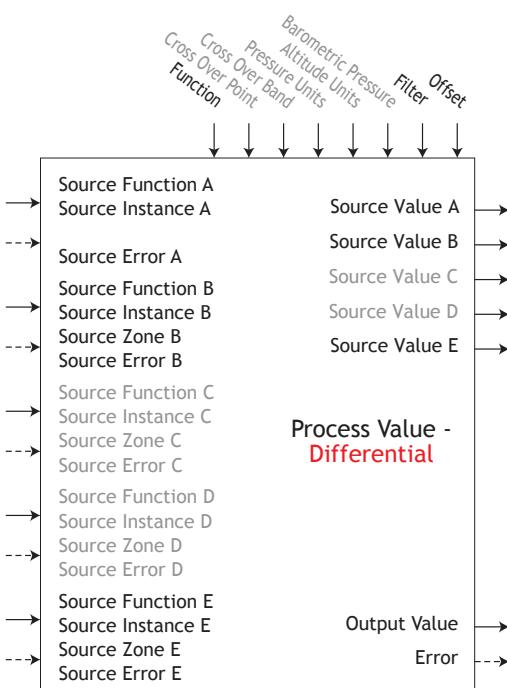
Process Value (cont.)



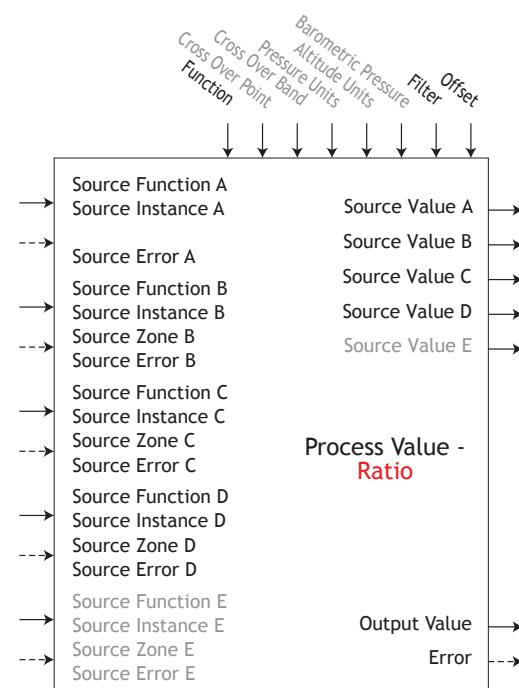
Output Value = Filter [Calculated Humidity + Offset] where
Source A is the Dry Bulb and Source B is the Wet Bulb
Note: Wet/Dry bulb temperatures are in degrees F and pressures are in
PSI. Output Value is % relative humidity. Useful temperature range is
10 to 350F



If B = OFF, Output Value = Filter [A + Offset]
If B = ON, Output Value = Filter [B + Offset]
Display units follows active source.

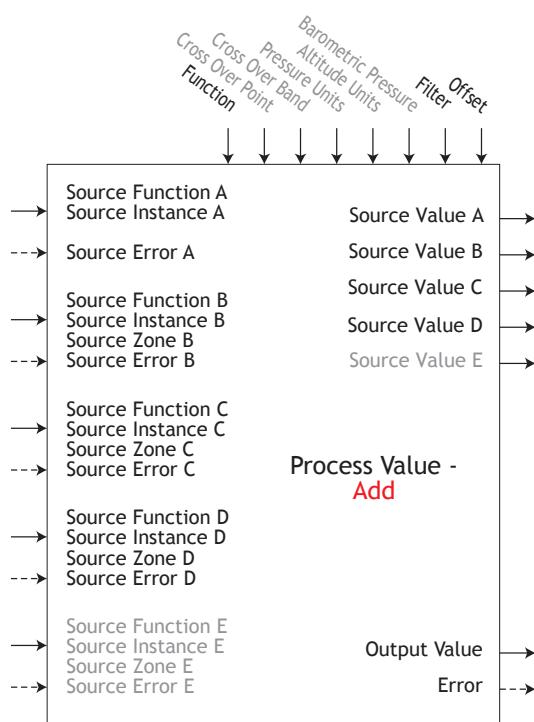


Output Value = Filter [(A - B) + Offset]
Display units follows Source A plus relative
Source B

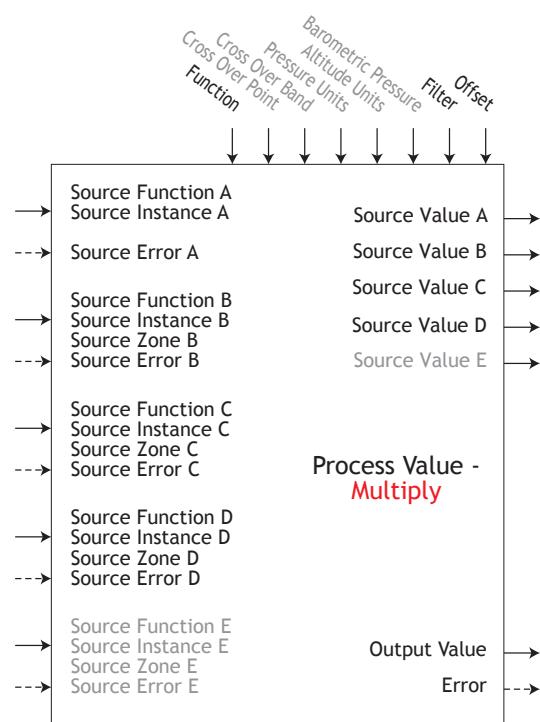


Output Value = Filter [(A / B) + Offset]
If display units of Source A = Source B, no display
units on output value, else follow Source A

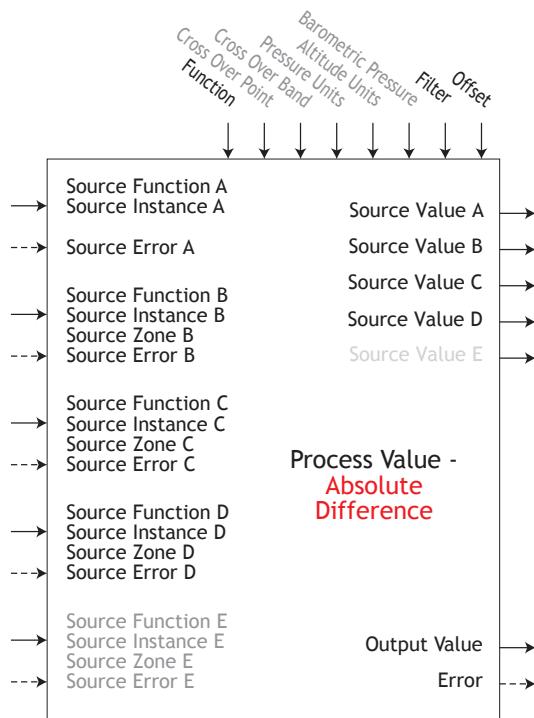
Process Value (cont.)



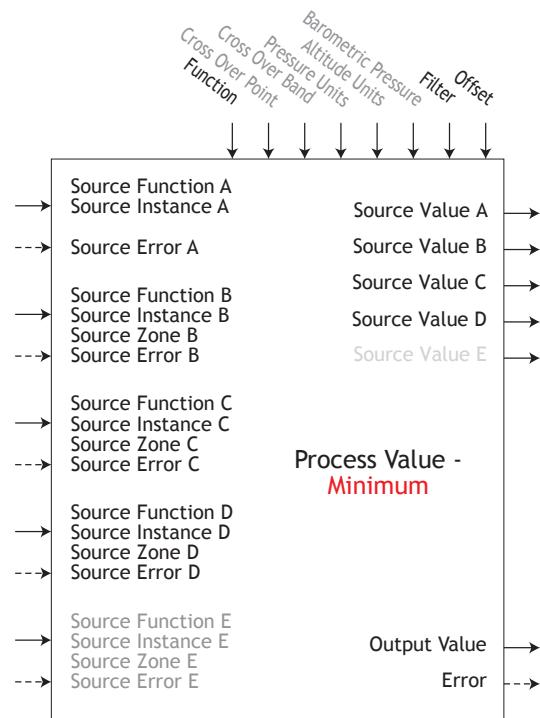
Output Value = Filter [(A + B + C + D) + Offset]
Display units follows last temperature source
else follow Source A



Output Value = Filter [(A * B * C * D) + Offset]
Display units follows last temperature source
else follow Source A

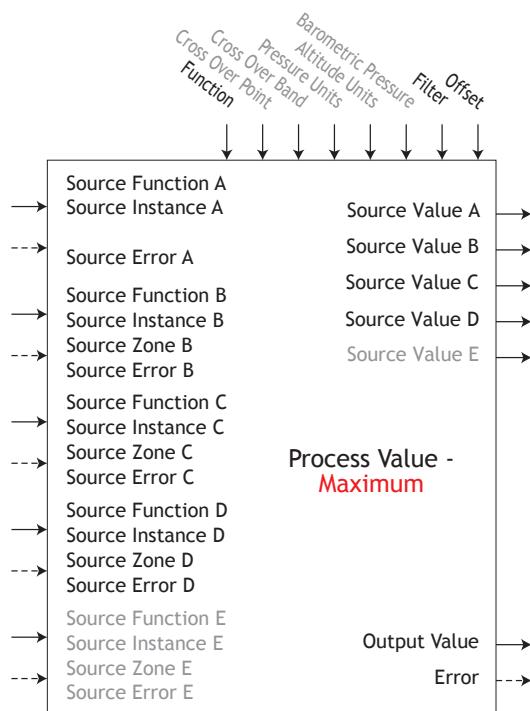


Output Value = Filter [| A - B | + Offset]
Display units follow Source A plus relative
Source B



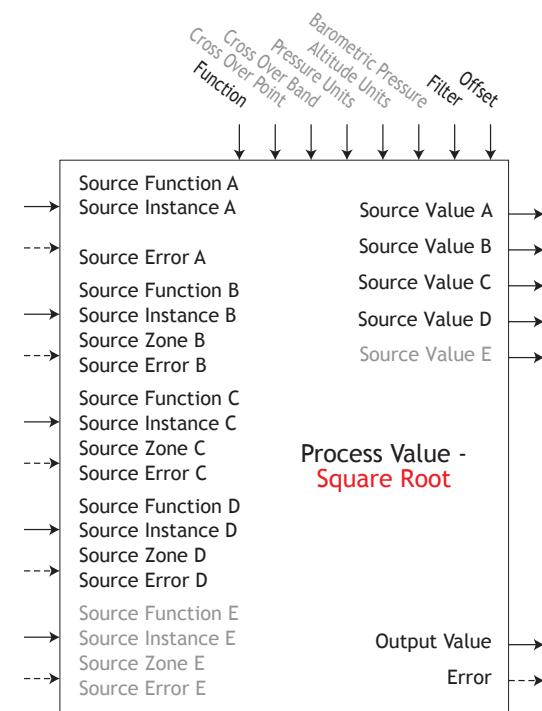
Output Value = Filter [Minimum Value (A : B : C : D : E) +
Offset]
Display units follows Source with minimum value.

Process Value (cont.)

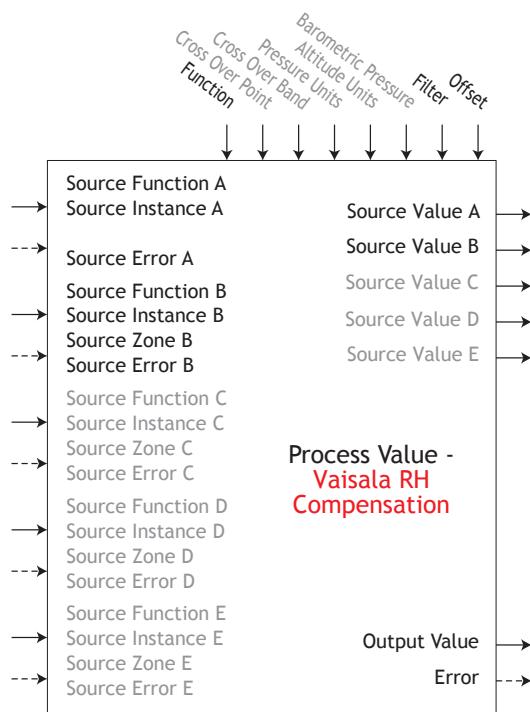


Output Value = Filter [Maximum Value (A : B : C : D) + Offset]

Display units follows Source with maximum value.

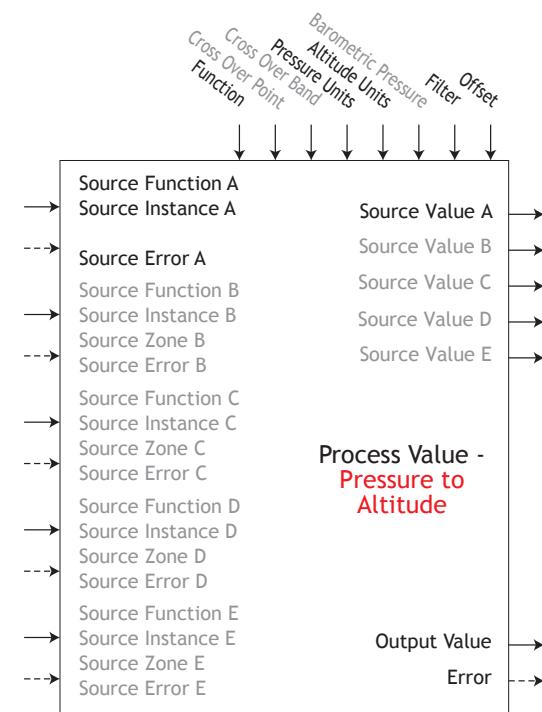


Output Value = Filter [Sqr Root A + Offset]
Display units follows Source A



Output Value = Filter [Calculated RH compensated for temperature + Offset].

Note: Source A is RH measured value from an uncompensated Vaisala RH sensor. Source B is temperature of the RH sensor in degrees F. The result is a "corrected" RH measured value. This calculation is effective over the temperature range of -75F to 350F.

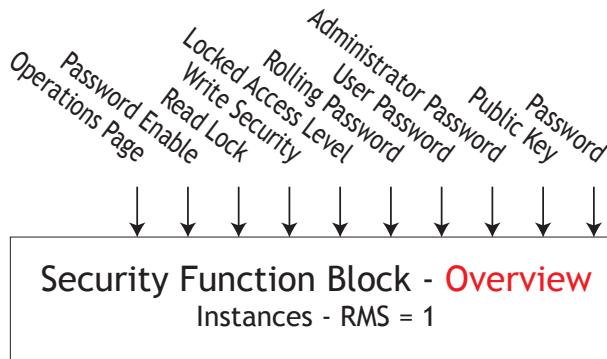


Output Value = Filter [Convert Source A in Pressure to Altitude + Offset]

Note: Pressure Altitude calculation is based on the International Standard Atmosphere 1976. Source A is a pressure signal and needs to be in PSI units for the calculation. The calculation is accurate from sea level to 90,000 feet. The standard is based on an altitude of 0 feet (sea level) pressure of 14.6967 PSI and a temperature of 59 degrees F. Result of calculation is in feet.

Security Function

If Password is enabled, the user must enter the Password to get to menus that have been blocked due to lock level settings. Rolling passwords required a new password each time the power has been cycled to the controller. It will be different for every controller. The administrator password is required to change the security settings even if the user enters their password to override the security settings.



LoC Lock Menu

FRct Factory Page

Parameter Name [Parameter ID] : Range or Choices

LoCo Operations Page [3002] : 1 to 3
PASE Password Enable [3015] : Off, On
rLoC Read Lock [3010] : 1 to 5
SLoC Write Security [3011] : 1 to 5
LoCL Locked Access Level [3016] : 1 to 5
ROLL Rolling Password [3019] : Off, On
PR5u User Password [3017] : 10 to 999
PR5R Administrator Password [3018] : 10 to 999

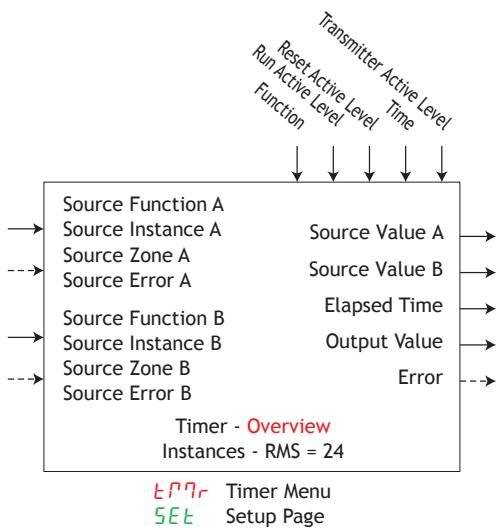
ULoC Unlock Menu

FRct Factory Page

Code Public Key [3020] : 0 to 9999
PR55 Password [3022] : 10 to 999

Timer Function

- Error [31018] = None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale
- Running [31015] = Off, ON



Parameter Name [Parameter ID] : Range or Choices

Fn	Function [31009] : Off, On Pulse, Delay, One Shot, Retentive
SFnA	Source Function A [31001] : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Special Function Output 1 to 4, Timer, Variable
S1A	Source Instance A [31003] : 1 to 250
S2A	Source Zone A [31005] : 0 to 24
SRA	Run Active Level [31011] : High (rising), Low (falling)
SFnB	Source Function B [31002] : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Special Function Output 1 to 4, Timer, Variable
S1B	Source Instance B [31004] : 1 to 250
S2B	Source Zone B [31006] : 0 to 24
SRB	Reset Active Level [31012] : High (rising), Low (falling)
t	Time [31013] : 0.0 to 9,999.0 seconds
LEU	Active Level [31014] : High, Low

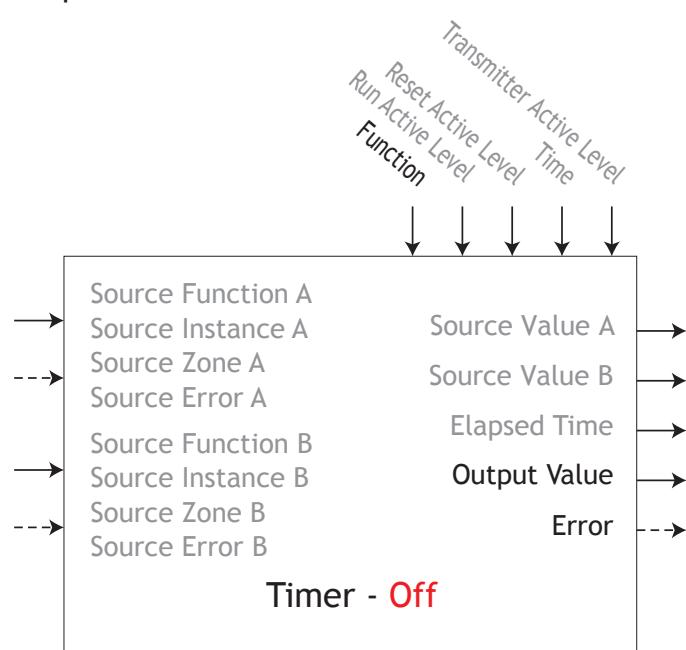
TMR Timer Menu
OPR Operations Page

SuA	Source Value A [31007] : Off, On
SuB	Source Value B [31008] : Off, On
E.t	Elapsed Time [31016] : 0.0 to 9,999.0 seconds
OU	Output Value [31010] : Off, On

Timer (cont.)

Off

Output Value = OFF

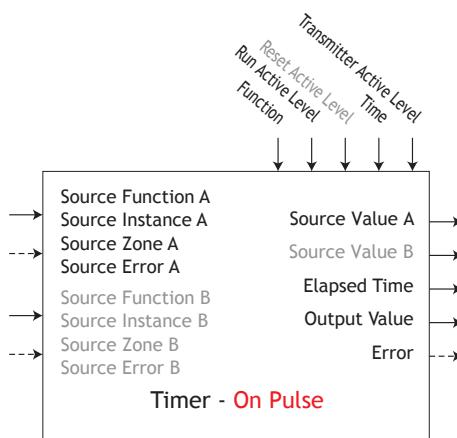


Timer (cont.)

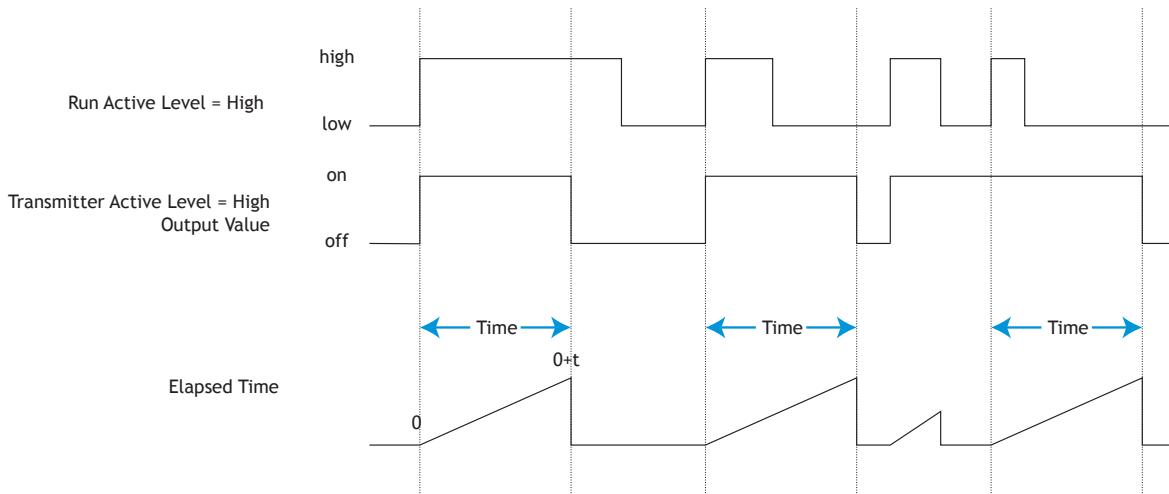
On Pulse

An On Pulse Timer is used to produce an output pulse of a constant duration. It can be used as a minimum on time for compressor control or other devices that do not want excessive cycling. Use Function to select On Pulse.

- On Pulse timers output a pulse of a set duration that is triggered or restarted by the level of Source A.
- Source Function A selects the type of source used for the input.
- Source Instance A and Source Zone A selects which source to use.
- Run Active Level sets which state makes the timer run or reset.
- Time sets the time duration of the output pulse.
- Transmitter Active Level sets which output state indicates the elapsed time is greater than or equal to the Time setting.



Timing Diagram of On Pulse with active state rising edge

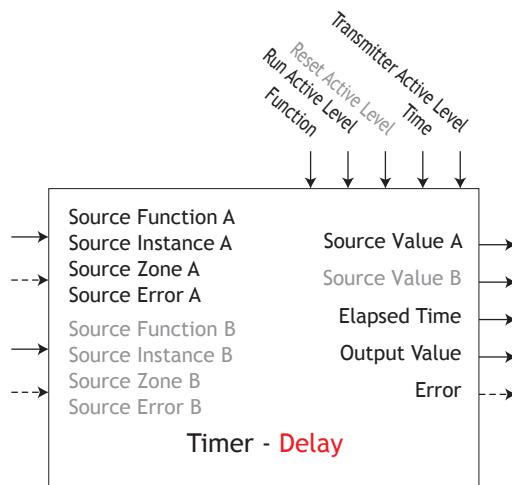


Timer (cont.)

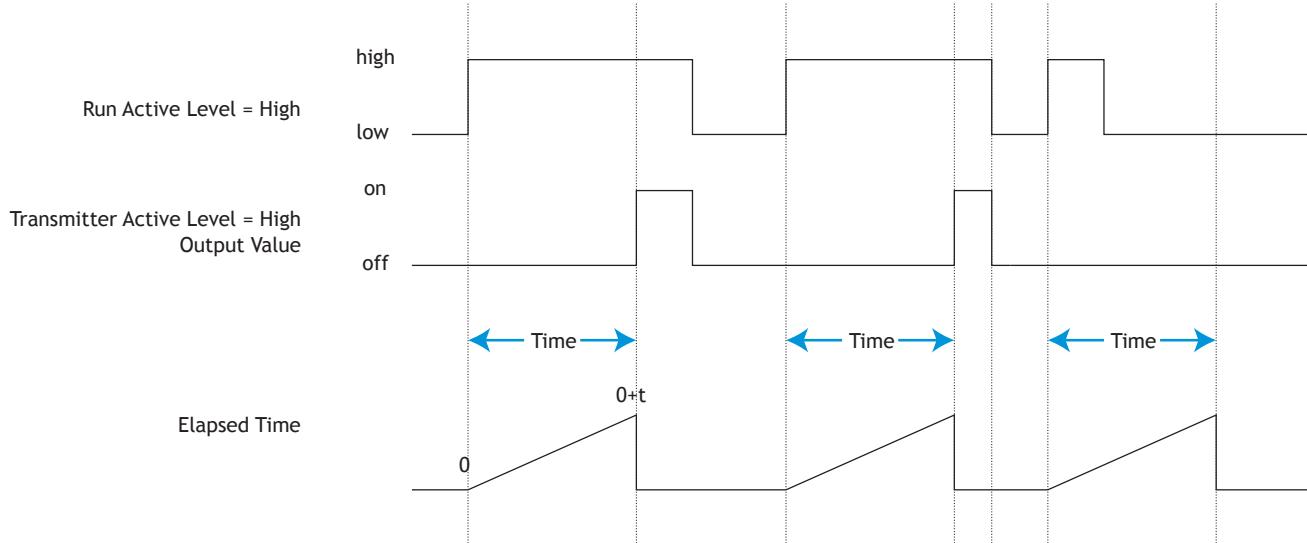
Delay

A delay timer is used to cause a delaying action. The delay can be made to happen on either the leading or trailing edge. This can be used to keep short input pulses from propagating or to have a secondary action occur at a known amount of time after the primary action; such as, turning on successive output devices.

- Use Function to select Delay.
- Delay timers will delay the response of a signal presented to Source A and then switch the output value.
- Source Function A selects the type of source used for the input.
- Source Instance A and Source Zone A selects which source to use.
- Run Active Level sets which state makes the timer run or reset.
- Overlap of run signal to time signal determines output value on time. If run signal is less than time signal, output does not activate.
- Transmitter Active Level sets which output state indicates the run time is greater than the Time setting.



Timing Diagram of Delay with active state rising edge

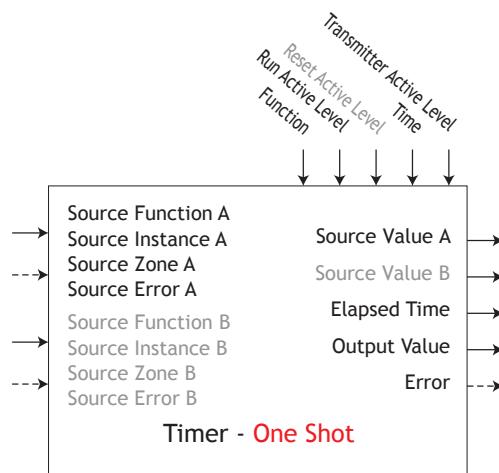


Timer (cont.)

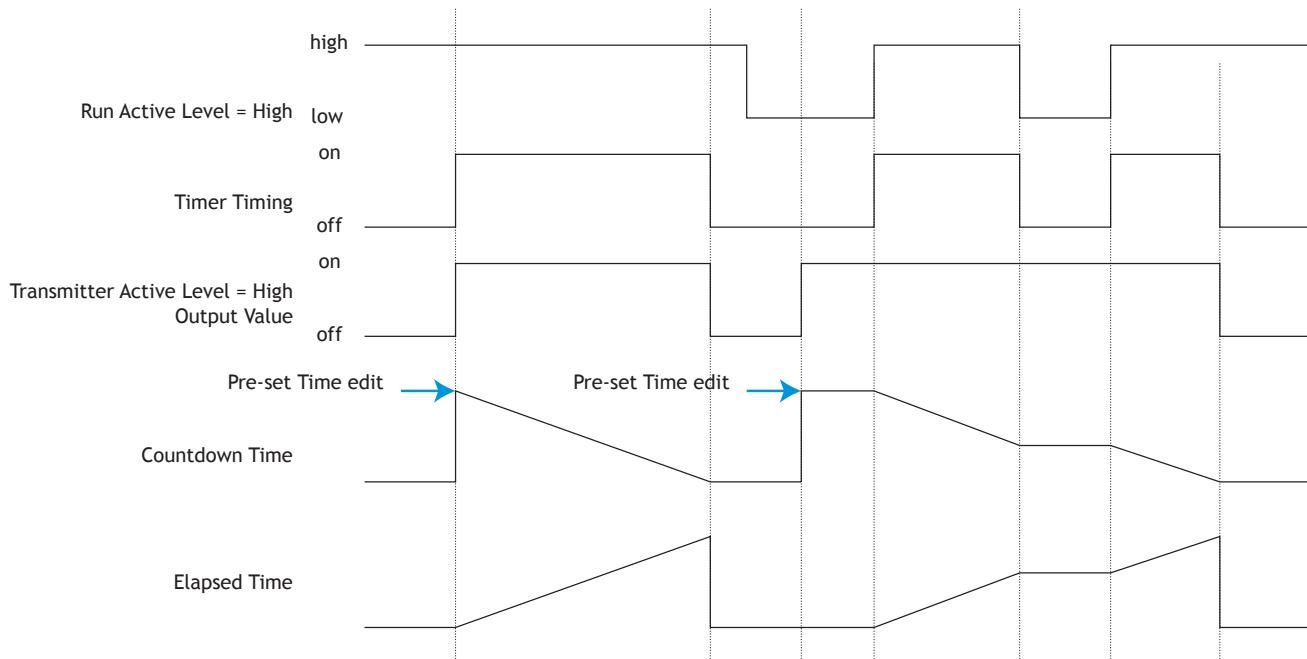
One Shot

The One Shot timer functions like a simple oven timer. The time value gets set by the user and it counts down to zero without retaining the original time (hence the name one-shot). This is intended to be used in applications where the user will manually set different times for each process.

- Use Function to select One Shot.
- One Shot timers count down while Source A is active; otherwise it holds. Preset of Time clears once time is elapsed.
- Source Function A selects the type of source used for the input.
- Source Instance A and Source Zone A selects which source to use.
- Run Active Level sets which state makes the timer count down.
- Transmitter Active Level sets which output state indicates the the timer is in countdown operation.



Timing Diagram of One Shot with active state rising edge

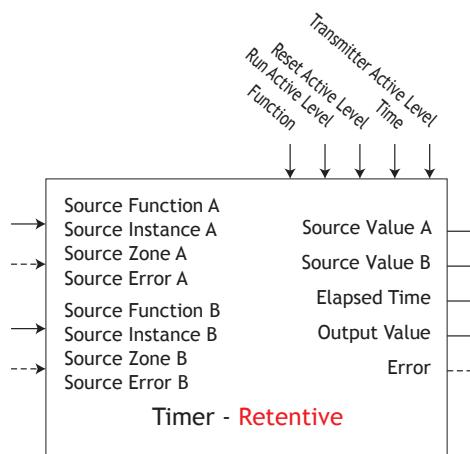


Timer (cont.)

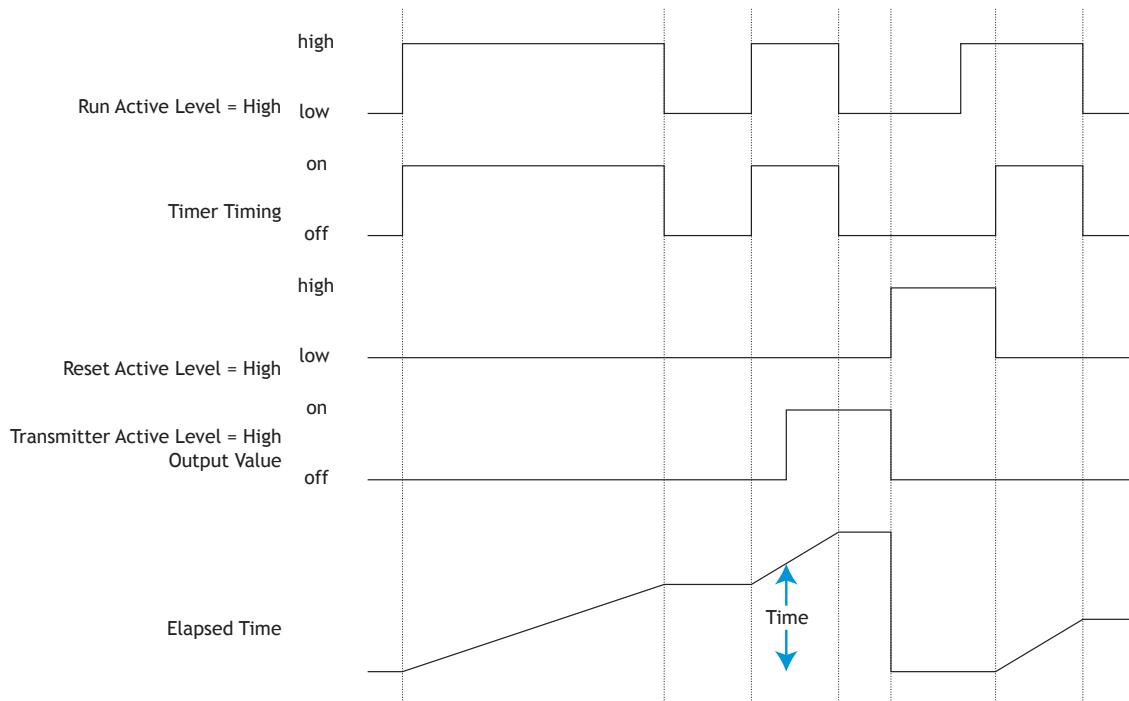
Retentive

A retentive timer is used to keep track of how much time something has been in a particular state. For example, this can be used to time how long something has been in an alarm state or how long it has been since a profile or step ran. The output can be used to trigger an event if the elapsed time has grown excessive.

- Use Function to select Retentive.
- Retentive timers count up from 0 to the Time parameter while Source A is active; otherwise it holds. It can be reset by Source B. The Elapsed time will continue to count up until the maximum value is reached and then rolls over unless a reset pulse is generated.
- Source Function A selects the type of source used for the input.
- Source Instance A and Source Zone A selects which source to use.
- Run Active Level sets which state makes the timer countdown.
- Transmitter Active Level sets which output state indicates the the timer is in countdown operation.



Timing Diagram of Retentive with all active state rising edge

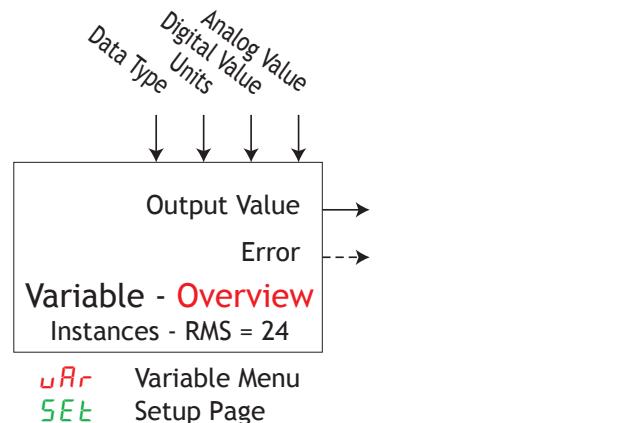


Variable Function

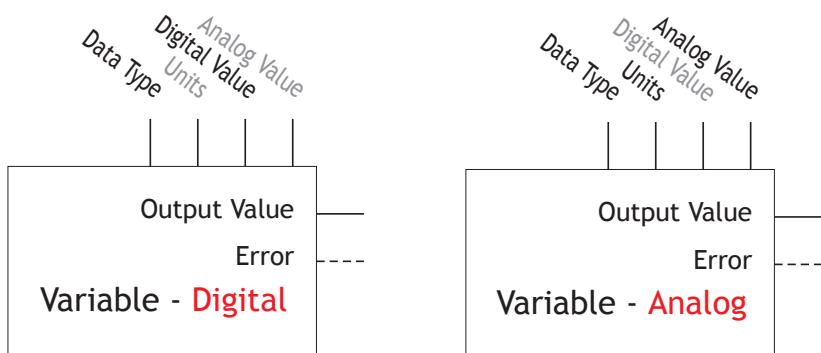
A variable function block is used to store a user supplied value and provide a source input to another function block with that value. As an example, you could use a variable function value as one input to a compare function. The other input to the compare function would determine the output value based on the user's supplied value.

This function simply passes the stored value to its output.

- Error [2005] : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale
- Output Value [2004] : -1,999.000 to 9,999.000 or On or Off



Parameter Name [Parameter ID] : Range or Choices	
<i>Type</i>	Data Type [2001] : Analog, Digital
<i>Unit</i>	Units [2007] : None, Absolute Temperature, Relative Temperature, Power, Process, Relative Humidity
<i>Dg</i>	Digital Value [2002] : On, Off
<i>AnLg</i>	Analog Value [2003] : -1,999.000 to 9,999.000



8

Chapter 8: Appendix

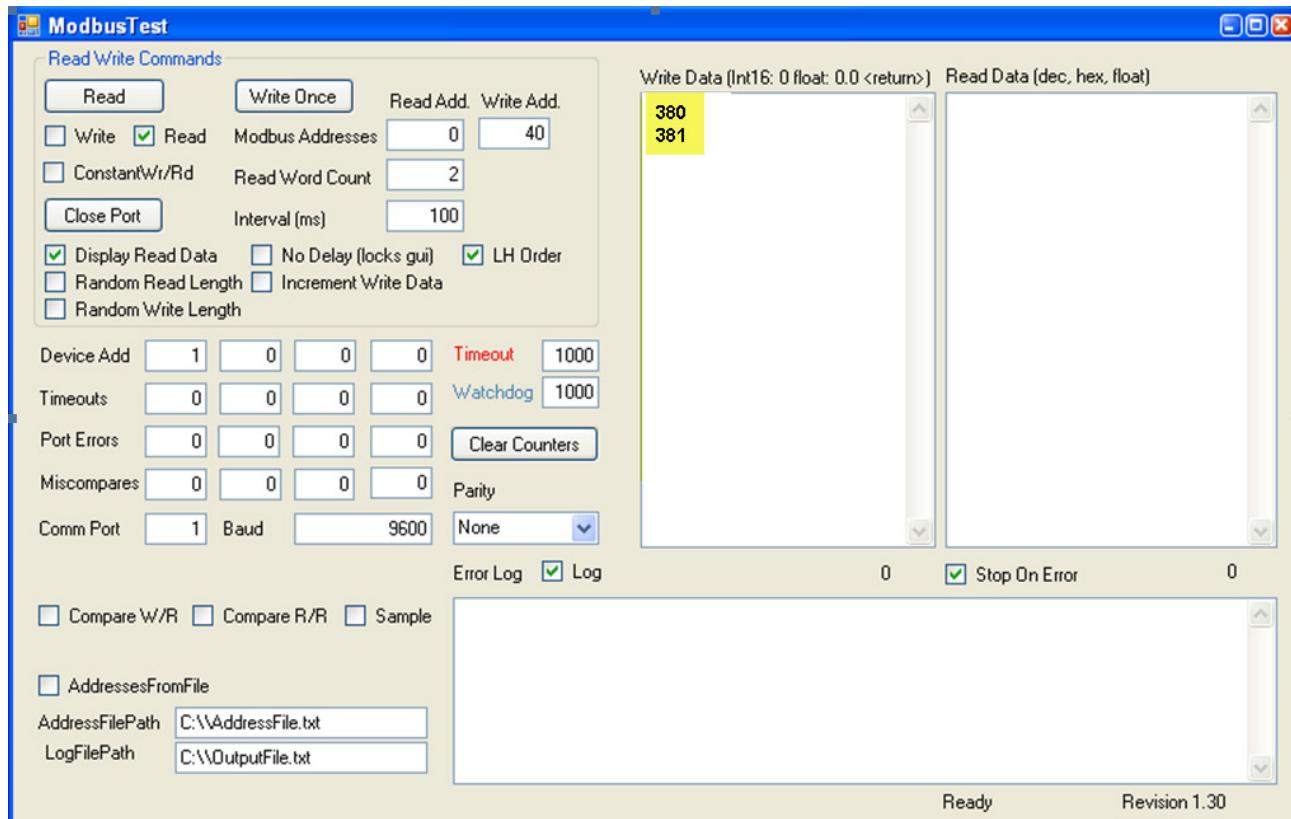
Troubleshooting Alarms, Errors and Control Issues

Indication	Description	Possible Cause(s)	Corrective Action
Alarm won't clear or reset	Alarm will not clear or reset with keypad or digital input	<ul style="list-style-type: none">• Alarm latching is active• Alarm set to incorrect output• Alarm is set to incorrect source• Sensor input is out of alarm set point range• Alarm set point is incorrect• Alarm is set to incorrect type• Digital input function is incorrect	<ul style="list-style-type: none">• Reset alarm when process is within range or disable latching• Set output to correct alarm source instance• Set alarm source to correct input instance• Correct cause of sensor input out of alarm range• Set alarm set point to correct trip point• Set alarm to correct type: process, deviation or power• Set digital input function and source instance
Alarm won't occur	Alarm will not activate output	<ul style="list-style-type: none">• Silencing is active• Blocking is active• Alarm is set to incorrect output• Alarm is set to incorrect source• Alarm set point is incorrect• Alarm is set to incorrect type	<ul style="list-style-type: none">• Disable silencing, if required• Disable blocking, if required• Set output to correct alarm source instance• Set alarm source to correct input instance• Set alarm set point to correct trip point• Set alarm to correct type: process, deviation or power
Alarm Error <i>ALE 1 ALE 2 ALE 3 ALE 4 ALE 5 ALE 6 ALE 7 ALE 8 ALE 9 AL 10 AL 11 AL 12</i>	Alarm state cannot be determined due to lack of sensor input	<ul style="list-style-type: none">• Sensor improperly wired or open• Incorrect setting of sensor type• Calibration corrupt	<ul style="list-style-type: none">• Correct wiring or replace sensor• Match setting to sensor used• Check calibration of controller

Modbus® - Programmable Memory Blocks

The Modbus assembly contains 40 pointers to the parameters of your choosing starting at Modbus register 40 (shown on the following page). The pointers are 32-bits long so are stored in two sequential registers. As an example, if we want to copy the analog input of the RMS (register 380) into register 40, we perform a multiple write command (0x10 function) of 380 into register 40 and 381 into register 41 as a single multi-write command.

Once the parameters of choice have been defined and written to the pointer registers, the working registers 200 to 279 then represent those parameters. Therefore, as in the example above, if 380 is in register 40, 381 in register 41, register 200 & 201 contains the 32-bit floating point result for analog input 1.

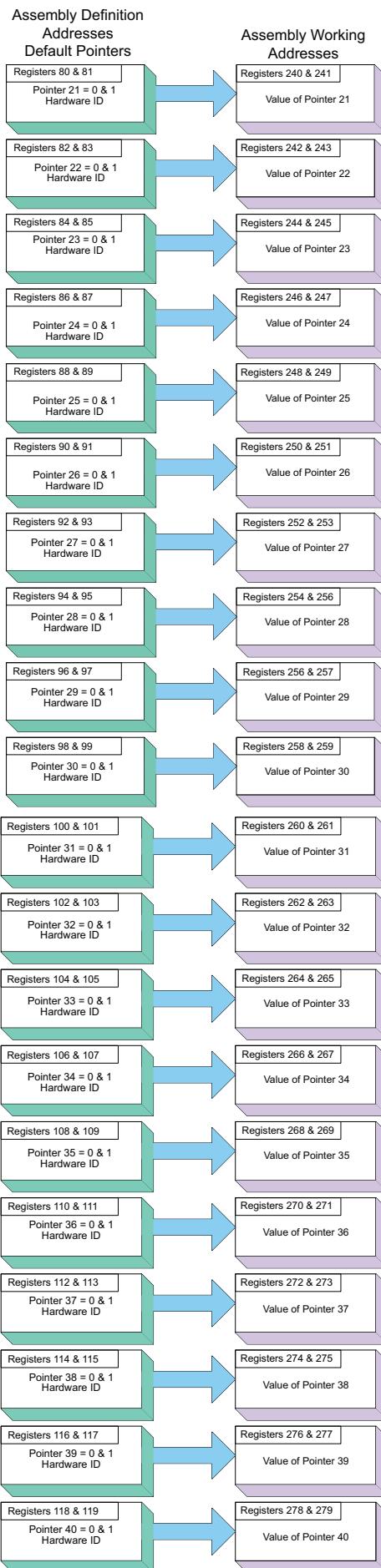
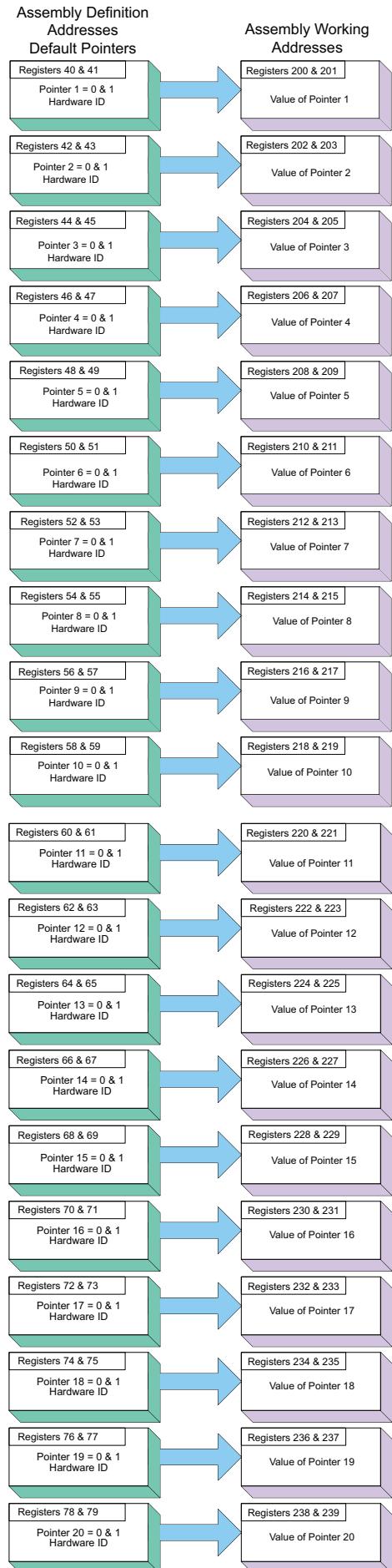


The screen shot above was taken from a program that can be found on the Watlow Support Tools DVD (shipped with the product) as well as on the Watlow website. On the DVD, it can be found under "Utility Tools" and is identified as "Modbus RTU Diagnostic Program for EZ-ZONE PM, RM and ST". A similar program can be found here as well for a connection utilizing Ethernet TCP.

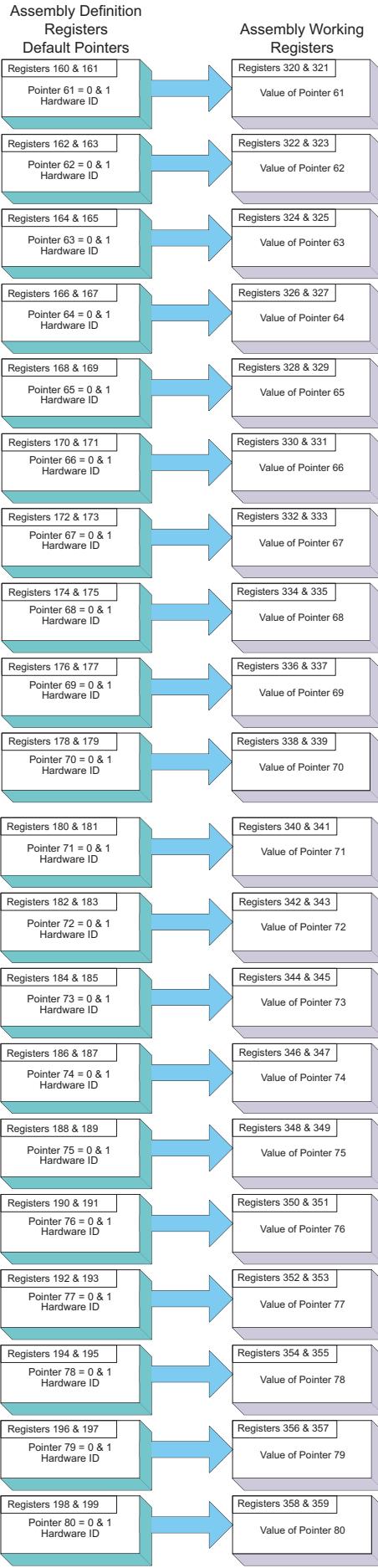
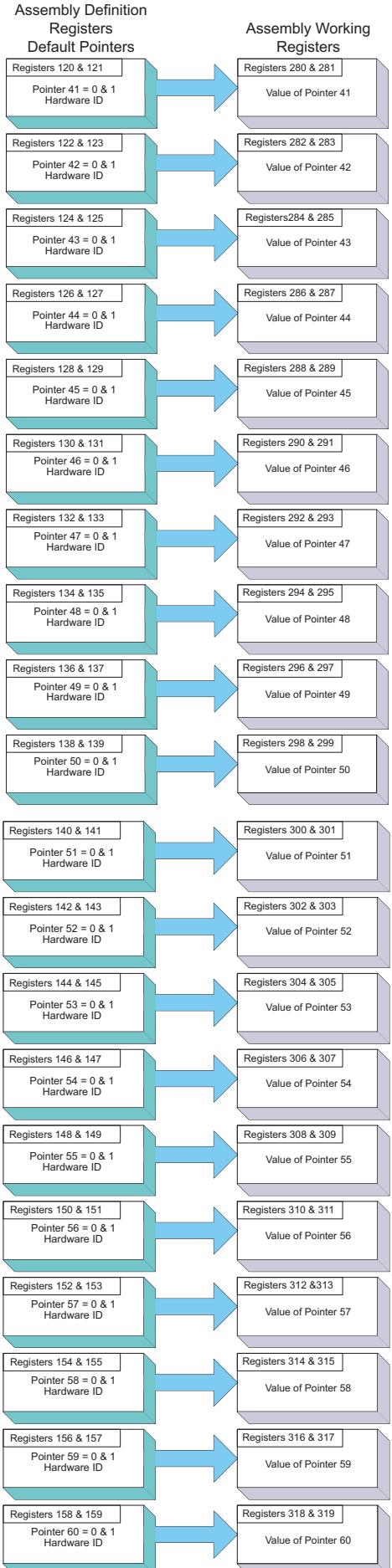
If it is easier to go to the web to acquire this software click on the link below and type "modbus" in the search field where both versions can be found with the same name. <http://www.watlow.com/literature/software.cfm>

Definition Addresses	Working Addresses	Definition Addresses	Working Addresses
40 & 41	200 & 201	120 & 121	280 & 281
42 & 43	202 & 203	122 & 123	282 & 283
44 & 45	204 & 205	124 & 125	284 & 285
46 & 47	206 & 207	126 & 127	286 & 287
48 & 49	208 & 209	128 & 129	288 & 289
50 & 51	210 & 211	130 & 131	290 & 291
52 & 53	212 & 213	132 & 133	292 & 293
54 & 55	214 & 215	134 & 135	294 & 295
56 & 57	216 & 217	136 & 137	296 & 297
58 & 59	218 & 219	138 & 139	298 & 299
60 & 61	220 & 221	140 & 141	300 & 301
62 & 63	222 & 223	142 & 143	302 & 303
64 & 65	224 & 225	144 & 145	304 & 305
66 & 67	226 & 227	146 & 147	306 & 307
68 & 69	228 & 229	148 & 149	308 & 309
70 & 71	230 & 231	150 & 151	310 & 311
72 & 73	232 & 233	152 & 153	312 & 313
74 & 75	234 & 235	154 & 155	314 & 315
76 & 77	236 & 237	156 & 157	316 & 317
78 & 79	238 & 239	158 & 159	318 & 319
80 & 81	240 & 241	160 & 161	320 & 321
82 & 83	242 & 243	162 & 163	322 & 323
84 & 85	244 & 245	164 & 165	324 & 325
86 & 87	246 & 247	166 & 167	326 & 327
88 & 89	248 & 249	168 & 169	328 & 329
90 & 91	250 & 251	170 & 171	330 & 331
92 & 93	252 & 253	172 & 173	332 & 333
94 & 95	254 & 255	174 & 175	334 & 335
96 & 97	256 & 257	176 & 177	336 & 337
98 & 99	258 & 259	178 & 179	338 & 339
100 & 101	260 & 261	180 & 181	340 & 341
102 & 103	262 & 263	182 & 183	342 & 343
104 & 105	264 & 265	184 & 185	344 & 345
106 & 107	266 & 267	186 & 187	346 & 347
108 & 109	268 & 269	188 & 189	348 & 349
110 & 111	270 & 271	190 & 191	350 & 351
112 & 113	272 & 273	192 & 193	352 & 353
114 & 115	274 & 275	194 & 195	354 & 355
116 & 117	276 & 277	196 & 197	356 & 357
118 & 119	278 & 279	198 & 199	358 & 359

Modbus Default Assembly Structure 40-119



Modbus Default Assembly Structure 120-199



Troubleshooting Alarms, Errors and Module Issues

Indication	Description	Possible Cause(s)	Corrective Action
Alarm won't clear or reset	Alarm will not clear or reset with key-pad or digital input	<ul style="list-style-type: none"> • Alarm latching is active • Alarm set to incorrect output • Alarm is set to incorrect source • Sensor input is out of alarm set point range • Alarm set point is incorrect • Alarm is set to incorrect type • Digital input function is incorrect 	<ul style="list-style-type: none"> • Reset alarm when process is within range or disable latching • Set output to correct alarm source instance • Set alarm source to correct input instance • Correct cause of sensor input out of alarm range • Set alarm set point to correct trip point • Set alarm to correct type: process, deviation or power • Set digital input function and source instance
Alarm won't occur	Alarm will not activate output	<ul style="list-style-type: none"> • Alarm silencing is active • Alarm blocking is active • Alarm is set to incorrect output • Alarm is set to incorrect source • Alarm set point is incorrect • Alarm is set to incorrect type 	<ul style="list-style-type: none"> • Disable alarm silencing, if required • Disable alarm blocking, if required • Set output to correct alarm source instance • Set alarm source to correct input instance • Set alarm set point to correct trip point • Set alarm to correct type: process, deviation or power
Alarm Error <i>AL.E 1 AL.E2 AL.E3 AL.E4 AL.E5 AL.E6 AL.E7 AL.E8 AL.E9 AL.I0 AL.I1 AL.I2 AL.I3 AL.I4 AL.I5 AL.I6</i>	Alarm state cannot be determined due to lack of sensor input	<ul style="list-style-type: none"> • Sensor improperly wired or open • Incorrect setting of sensor type • Calibration corrupt 	<ul style="list-style-type: none"> • Correct wiring or replace sensor • Match setting to sensor used • Check calibration of controller

Indication	Description	Possible Cause(s)	Corrective Action
Alarm Low <i>ALL 1 ALL 2 ALL 3 ALL 4 ALL 5 ALL 6 ALL 7 ALL 8 ALL 9 ALL 10 AL. 11 AL. 12 AL. 13 AL. 14 AL. 15 AL. 16</i>	Sensor input below low alarm set point	<ul style="list-style-type: none"> • Temperature is less than alarm set point • Alarm is set to latching and an alarm occurred in the past • Incorrect alarm set point • Incorrect alarm source 	<ul style="list-style-type: none"> • Check cause of under temperature • Clear latched alarm • Establish correct alarm set point • Set alarm source to proper setting
Alarm High <i>AL.H 1 AL.H 2 AL.H 3 AL.H 4 AL.H 5 AL.H 6 AL.H 7 AL.H 8 AL.H 9 AL. 10 AL. 11 AL. 12 AL. 13 AL. 14 AL. 15 AL. 16</i>	Sensor input above high alarm set point	<ul style="list-style-type: none"> • Temperature is greater than alarm set point • Alarm is set to latching and an alarm occurred in the past • Incorrect alarm set point • Incorrect alarm source 	<ul style="list-style-type: none"> • Check cause of over temperature • Clear latched alarm • Establish correct alarm set point • Set alarm source to proper setting
No Display	No display indication or LED illumination	<ul style="list-style-type: none"> • Power to controller is off • Fuse open • Breaker tripped • Safety interlock switch open • Separate system limit control activated • Wiring error • Incorrect voltage to controller 	<ul style="list-style-type: none"> • Turn on power • Replace fuse • Reset breaker • Close interlock switch • Reset limit • Correct wiring issue • Apply correct voltage, check part number

Indication	Description	Possible Cause(s)	Corrective Action
No Serial Communication	Cannot establish serial communications with the controller	<ul style="list-style-type: none"> • Address parameter incorrect • Incorrect protocol selected • Baud rate incorrect • Parity incorrect • Wiring error • EIA-485 converter issue • Incorrect computer or PLC communications port • Incorrect software setup • Wires routed with power cables • Termination resistor may be required 	<ul style="list-style-type: none"> • Set unique addresses on network • Match protocol between devices • Match baud rate between devices • Match parity between devices • Correct wiring issue • Check settings or replace converter • Set correct communication port • Correct software setup to match controller • Route communications wires away from power wires • Place 120 Ω resistor across EIA-485 on last controller
Device Error <i>100</i> <i>rEt</i>	Controller displays internal malfunction message at power up.	<ul style="list-style-type: none"> • Controller defective • Sensor input over driven 	<ul style="list-style-type: none"> • Replace or repair controller • Check sensors for ground loops, reverse wiring or out of range values.
Heater Error <i>hEr</i>	Heater Error	<ul style="list-style-type: none"> • Current through load is above current trip set point • Current through load is below current trip set point 	<ul style="list-style-type: none"> • Check that the load current is proper. Correct cause of over-current and/or ensure current trip set point is correct. • Check that the load current is proper. Correct cause of undercurrent and/or ensure current trip set point is correct.

Indication	Description	Possible Cause(s)	Corrective Action
Current Error <i>E.Er</i>	Load current incorrect.	<ul style="list-style-type: none"> Shorted solid-state or mechanical relay Open solid-state or mechanical relay Current transformer load wire associated to wrong output Defective current transformer or controller Noisy electrical lines 	<ul style="list-style-type: none"> Replace relay Replace relay Route load wire through current transformer from correct output, and go to the <i>E.S</i>, Source Output Instance parameter (Setup Page, Current Menu) to select the output that is driving the load. Replace or repair sensor or controller Route wires appropriately, check for loose connections, add line filters
Remote User Interface (RUI) menus inaccessible	Unable to access <i>SET</i> , <i>OPER</i> , <i>FCTY</i> or <i>ProF</i> menus or particular prompts in Home Page	<ul style="list-style-type: none"> Security set to incorrect level Digital input set to lock-out keypad Custom parameters incorrect 	<ul style="list-style-type: none"> Check <i>LoE</i> settings in Factory Page Enter appropriate password in <i>ULoE</i> setting in Factory Page Change state of digital input Change custom parameters in Factory Page
RUI value to low <i>uRL.L</i>	Value to low to be displayed in 4 digit LED display <-1999	<ul style="list-style-type: none"> Incorrect setup 	<ul style="list-style-type: none"> Check scaling of source data
RUI value to high <i>uRL.h</i>	Value to high to be displayed in 4 digit LED display >9999	<ul style="list-style-type: none"> Incorrect setup 	<ul style="list-style-type: none"> Check scaling of source data

Detection of and Rules Around Abnormal Sensor Conditions	
Inputs	Detection of Abnormal Conditions
Thermocouple	
Shorted	No direct detection, Open loop firmware detection.
Open	Yes, Parasitic pull-up
Reversed	Yes, firmware detection
Current Source	
Shorted	Range limiting only
Open	Range limiting only
Reversed	Range limiting only
Voltage Source	
Open	Range limiting only
Shorted	Range limiting only
Reversed	Range limiting only
RTD	
S1 open	Yes, pulled up.
S2 open	Not implemented.
S3 open	Yes, pulled up.
S1 short to S2	Yes, pulled up
S1 short to S3	Yes, pulled down to under range.
S2 shorted to S3	Not implemented, Possible, monitor S2 voltage.
S1 and S2 open	Yes, pulled down to under range.
S1 and S3 open	Yes, S1 pulled up.
S2 and S3 open	Yes pulled up.
Thermistor	
S1 open	Yes, pulled up to sensor over range.
S3 open	Yes, pulled up to sensor over range.
S1 short to S3	Yes, pulled down to sensor under range.
S1 and S3 open	Yes, S1 pulled up to sensor over range.

RMS Specifications

Line Voltage/Power

- 20.4 to 30.8V \approx (ac/dc), 50/60Hz, ± 5 percent
- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a class 2 or SELV rating. (Safety Extra Low Voltage)
- Data retention upon power failure via nonvolatile memory
- Compliant with Semi F47-0200, Figure R1-1 voltage sag requirement

Available (optional) Power Supplies

- AC/DC Power supply converter 90-264V \sim (ac) to 24V \equiv (dc) volts.
- P/N 0847-0299-0000: 31 W
- P/N 0847-0300-0000: 60 W
- P/N 0847-0301-0000: 91 W

Environment

- 0 to 149°F (-18 to 65°C) operating temperature
- -40 to 185°F (-40 to 85°C) storage temperature
- 0 to 90 percent RH, non-condensing
- RM modules are considered to be open type equipment needing to be installed in a fire and shock protection enclosure, such as a NEMA Type 1 enclosure; unless all circuit connections are Class 2 or SELV

Accuracy

- Calibration accuracy and sensor conformity: $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$ at the calibrated ambient temperature and rated line voltage
- Types R, S, B; 0.2%
- Type T below -50°C ; 0.2%
- Calibration ambient temperature at $25^\circ\text{C} \pm 3^\circ\text{C}$ ($77^\circ\text{F} \pm 5^\circ\text{F}$)
- Accuracy span: 540°C (1000°F) min.
- Temperature stability: $\pm 0.1^\circ\text{C}/^\circ\text{C}$ ($\pm 0.1^\circ\text{F}/^\circ\text{F}$) rise in ambient max.

Agency Approvals

- UL®/EN 61010 listed; c-UL C22.2 #61010 File E185611 QUYX, QUYX7
- ANSI/ISA 12.12.01-2007 Hazardous Locations Class 1, Div. 2-Group A, B, C, D Temperature code T4 (optional) File E184390 QUZW, QUZW7
- EN 60529 IP20; RM modules
- UL® 50, Type 4X Indoor use, EN 60529 IP66; 1/16 DIN RUI, NEMA 4X
- RoHS by design, W.E.E.E.
- CE

Serial Communications

- The RMS module ships with isolated standard bus protocol for configuration and communication connection to all other EZ-ZONE products, Modbus RTU is optional.

Maximum RM System Configuration

- Maximum system capacity (all RM modules) is 16 with one RM Access (RMA) module.

Mounting

- DIN-rail specification EN50022, 35 x 7.5 mm (1.38 x 0.30 in.)
- Can be DIN-rail mounted or chassis mounted with customer-supplied fasteners

Dimensions	Weight
155.0 mm (6.10 in)	116.08 mm (4.57 in) Controller: 453.59 g (16 oz.)

Wiring Termination—Touch-Safe Terminals

- Right angle and front screw type terminal blocks (slots A, B, D, E)
 - Input, power and controller output terminals, touch-safe removable 12 to 30 AWG
- Wire strip length 7.6 mm (0.30 in.)
- Torque 0.56 Nm (5.0 lb.-in.) right angle, 0.5 Nm (4.51 lb-in) front terminal block
- Dimensional Drawing
- Use solid or stranded copper conductors only

Connector	Dimension "A" (mm/in.)
Standard	148 (5.80)
Straight	155 (6.10)

Optional Accessories

Remote User Interface (RUI)

- 1/16 DIN
- Dual 4 digit, 7-segment LED displays
- Keys: Advance, infinity, up, down keys, plus an EZ-KEY programmable function key
- Typical display update rate 1Hz

EZ-ZONE RMS Product Documentation

- User Manual, printed hard copy, P/N 0600-0071-0000
- Watlow Support Tools CD, P/N 0601-0001-0000

Universal Input

- Thermocouple, grounded or ungrounded sensors
 - $>20M\Omega$ input impedance
- Max. $2K\Omega$ source resistance
- $3\mu A$ open sensor detection
- RTD 2-wire, platinum, 100Ω and 1000Ω @ $0^\circ C$ ($32^\circ F$) calibration to DIN curve ($0.00385 \Omega/\Omega/^\circ C$)
- Process, 0-20mA @ 100Ω , or 0-10V= (dc) @ $20k\Omega$ input impedance; scalable, 0-50mV

Voltage Input Ranges

- Accuracy $\pm 10mV \pm 1$ LSD at standard conditions
- Temperature stability ± 100 PPM/ $^\circ C$ maximum

Milliamp Input Ranges

- Accuracy $\pm 20\mu\text{A} \pm 1$ LSD at standard conditions
- Temperature stability ± 100 PPM/°C maximum

Resolution Input Ranges

- 0 to 10V: 200 μV nominal
- 0 to 20 mA: 0.5 mA nominal

- Potentiometer: 0 to 1,200 Ω
- Inverse scaling
- Current: input range is 0 to 50mA, 100 Ω input impedance
- Response time: 1 second max., accuracy $\pm 1\text{mA}$ typical

Input Type	Max Error @ 25 Deg C	Accuracy Range Low	Accuracy Range High	Units
J	± 1.75	0	750	Deg C
K	± 2.45	-200	1250	Deg C
T	± 1.55	-200	350	Deg C
N	± 2.25	0	1250	Deg C
E	± 2.10	-200	900	Deg C
R	± 3.9	0	1450	Deg C
S	± 3.9	0	1450	Deg C
B	± 2.66	870	1700	Deg C
C	± 3.32	0	2315	Deg C
D	± 3.32	0	2315	Deg C
F (PTII)	± 2.34	0	1343	Deg C
RTD, 100 ohm	± 2.00	-200	800	Deg C
RTD, 1000 ohm	± 2.00	-200	800	Deg C
mV	± 0.05	-50	50	mV
Volts	± 0.01	0	10	Volts
mAdc	± 0.02	0	20	mAmps DC
mAac	± 5	0	50	mAmps AC
Potentiometer, 1K range	± 1	0	1000	Ohms
Resistance, 5K range	± 5	0	5000	Ohms
Resistance, 10K range	± 10	0	10000	Ohms
Resistance, 20K range	± 20	0	20000	Ohms
Resistance, 40K range	± 40	0	40000	Ohms

Operating Range			
Input Type	Range Low	Range High	Units
J	-210	1200	Deg C
K	-270	1371	Deg C
T	-270	400	Deg C
N	-270	1300	Deg C
E	-270	1000	Deg C
R	-50	1767	Deg C
S	-50	1767	Deg C
B	0	1816	Deg C
C	0	2315	Deg C
D	0	2315	Deg C
F (PTII)	0	1343	Deg C
RTD (100 ohm)	-200	800	Deg C
RTD (1000 ohm)	-200	800	Deg C
mV	0	50	mV
Volts	0	10	Volts
mAdc	0	20	mAmps DC
mAac	0	50	mAmps AC
Potentiometer, 1K range	0	1200	Ohms
Resistance, 5K range	0	5000	Ohms
Resistance, 10K range	0	10000	Ohms
Resistance, 20K range	0	20000	Ohms
Resistance, 40K range	0	40000	Ohms

Thermistor Input				
Input Type	Max Error @ 25 Deg C	Accuracy Range Low	Accuracy Range High	Units
Thermistor, 5K range	±5	0	5000	Ohms
Thermistor, 10K range	±10	0	10000	Ohms
Thermistor, 20K range	±20	0	20000	Ohms
Thermistor, 40K range	±40	0	40000	Ohms

- 0 to 40KΩ, 0 to 20KΩ, 0 to 10KΩ, 0 to 5KΩ
- 2.252KΩ and 10KΩ base at 25°C
- Linearization curves built in
- Third party Thermistor compatibility requirements

Base R @ 25C	Alpha Techniques	Beta THERM	YSI	Thermistor Curve
2.252K	Curve A	2.2K3A	004	A
10K	Curve A	10K3A	016	B
10K	Curve C	10K4A	006	C

Digital Input

- DC voltage
 - Max. input 36V @ 3mA
 - Min. high state 3V at 0.25mA
 - Max. low state 2V
- Dry contact
 - Min. open resistance 10KΩ
 - Max. closed resistance 50Ω
 - Max. short circuit 13mA
- Digital input update rate 10Hz

Output Hardware

- Electromechanical relay, Form A, 5A, 24 to 240V~ (ac) or 30V= (dc) max., resistive load, 100,000 cycles at rated load. Requires a min. load of 20mA at 24V, 125VA pilot duty
- Digital outputs
 - Update rate 10Hz
 - Switched DC
 - » Output voltage 20V=
 - » Max. supply current source 40mA at 20V=
 - Open Collector
 - » Switched voltage max.: 32V= (dc)
 - » Max. switched current per output: 1.5A
 - » Max. switched current for all 6 outputs combined: 8A
- Universal process/retransmit, Output range selectable:
 - 0 to 10V = (dc) into a min. 1,000Ω load
 - 0 to 20mA into max. 800Ω load

Resolution

- » dc ranges: 2.5mV nominal
- » mA ranges: 5 μA nominal

Calibration Accuracy

- » dc ranges: ±15 mV
- » mA ranges: ±30 μA

Temperature Stability

- » 100 ppm/°C

Programmable Application Blocks

Actions (events) 16 total

Alarms 16 total

Compare 24 total

- Off, greater than, less than, equal, not equal, greater than or equal, less than or equal

Counters 4 total

- Counts up or down loads, predetermined value on load signal. Output is active when count value equals predetermined target value

Logic 24 total

- Off, and, nand, or, nor, equal, not equal, Latch

Linearization 24 total

- Interpolated or stepped relationship

Math 24 total

- Off, average, process scale, deviation scale, differential (subtraction), ratio (divide), add, multiply, absolute difference, min., max., square root, sample and hold

Process Value 16 total

- Off, sensor backup, average, crossover, wet/dry bulb, switch over, differential (subtraction), ratio (divide), add, multiply, absolute difference, min., max., square root

Timers 24 total

- *On Pulse* produces output of fixed time on active edge of timer run signal
- *Delay* output is a delayed start of timer run, off at same time
- *One Shot* oven timer
- *Retentive* measures timer run signal, output on when accumulated time exceeds target

Variable 24 total

- User value for digital or analog variable

Note:

These specifications are subject to change without prior notice.

RMS Ordering Information

The Scanner module requires a Class 2 or SELV power supply 20.4 to 30.8 V ~ (ac) / — (dc), communication port provided for configuration with EZ-ZONE Configurator software.

Code Number

①② EZ-ZONE Rail Mount	③ High Density Module	④ Connector Style/ Custom Product	⑤ Slot A	⑥ Slot B	⑦ Slot D	⑧ Slot E	⑨ Future Options	⑩ Enhanced Options	⑪⑫ Additional Options
RM	S	-					A		

Connector Style/Custom Product - Digit ④

- A = Right angle screw connector (standard)
- F = Front screw connector
- S = Custom

Slot A - Digit ⑤

- R = 4 Universal inputs (t/c, 2-wire RTD, 0-10Vdc, 0-20mA, 1K potentiometer) without control loops
- P = 4 Thermistor inputs without control loops

Slot B - Digit ⑥

- A = None
- R = 4 Universal inputs (t/c, 2-wire RTD, 0-10Vdc, 0-20mA, 1K potentiometer) without control loops
- P = 4 Thermistor inputs without control loops

Slot D - Digit ⑦

- A = None
- C = 6 Digital I/O
- F = 3 Universal Process/Retransmit outputs
- J = 4 Mechanical relay 5A, Form A
- L = 4 SSR's at 2 amps each
- P = 4 Thermistor inputs without control loops
- R = 4 Universal inputs (t/c, 2-wire RTD, 0-10Vdc, 0-20mA, 1K potentiometer) without control loops

Slot E - Digit ⑧

- A = None
- B = 1 Digital I/O and 2 - 5A Mechanical relays (1 Form A and 1 Form C)
- C = 6 Digital I/O
- F = 3 Universal Process/Retransmit outputs
- J = 4 Mechanical relay 5A, Form A
- L = 4 SSR's at 2 amps each
- P = 4 Thermistor inputs without control loops
- R = 4 Universal inputs (t/c, 2-wire RTD, 0-10Vdc, 0-20mA, 1K potentiometer) without control loops

Future Options - Digit ⑨

- A = Standard

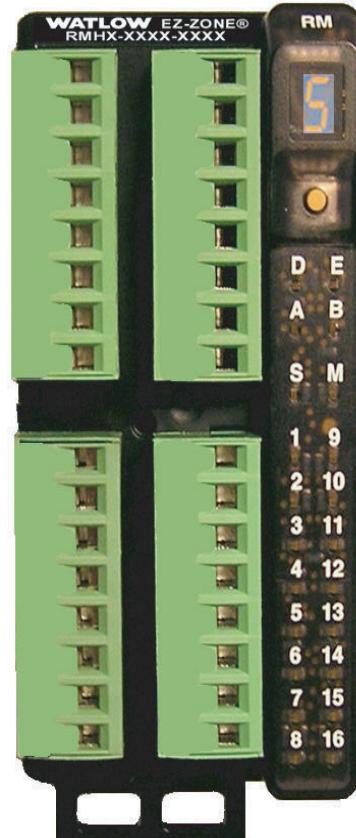
Enhanced Options - Digit ⑩

- A = Standard Bus
- 1 = Standard Bus and Modbus RTU 485 (selectable via switch)

Additional Options - Digits ⑪⑫

Firmware, Overlays, Parameter Settings

- AA = Standard
- AB = Replacement connectors hardware only, for the entered model number
- 12 = Class 1 Div 2 (not available with mechanical relays)
- XX = Custom (consult factory)



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Declaration of Conformity

EZ Zone Series RM



WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following Series RM (Rail Mount) products:

Model Numbers: RM followed by additional letters or numbers describing use of up to four module options of various inputs and outputs or communications.
Classification: Temperature control, Installation Category II, Pollution degree 2
Voltage and Frequency: SELV 24 to 28 V \sim ac 50/60 Hz or dc
Power Consumption: RMA models 4 Watts, any other RM model 7 Watts
Environmental Rating: IP20

Meet the essential requirements of the following European Union Directives by using the relevant standards shown below to indicate compliance.

2004/108/EC Electromagnetic Compatibility Directive

EN 61326-1	2013	Electrical equipment for measurement, control and laboratory use – EMC requirements, Industrial Immunity, Class A Emissions (<i>Not for use in a Class B environment without additional filtering</i>).
EN 61000-4-2	2009	Electrostatic Discharge Immunity
EN 61000-4-3	2010	Radiated Field Immunity
EN 61000-4-4	2012	Electrical Fast-Transient / Burst Immunity
EN 61000-4-5	2006	Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6	2014	Conducted Immunity
EN 61000-4-11	2004	Voltage Dips, Short Interruptions and Voltage Variations Immunity
EN 61000-3-2	2009	Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3 ¹	2013	Voltage Fluctuations and Flicker
SEMI F47	2000	Specification for Semiconductor Sag Immunity Figure R1-1

¹NOTE: To comply with flicker requirements cycle time may need to be up to 160 seconds if load current is at 15A, or the maximum source impedance needs to be < 0.13Ω. Control power input of RM models comply with 61000-3-3 requirements.

2006/95/EC Low-Voltage Directive

EN 61010-1	2011	Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements
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Compliant with 2011/65/EU RoHS Directive

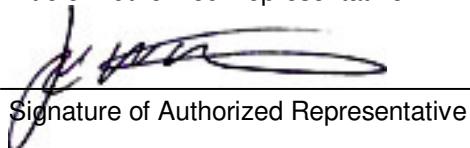
Per 2012/19/EU W.E.E Directive Please Recycle Properly

Joe Millanes
Name of Authorized Representative

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Place of Issue

Director of Operations
Title of Authorized Representative

September 2014
Date of Issue


Signature of Authorized Representative

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